

Macquarie

**Sydney Metro Martin Place
integrated station development**

**South Tower, SSD DA Stage 2:
Fire Engineering Brief**

CSWSMP-MAC-SMS-FL-BRF-999902

Revision 01 | 23 August 2018

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 247838

Arup
Arup Pty Ltd ABN 18 000 966 165



Arup
Level 10 201 Kent Street
PO Box 76 Millers Point
Sydney 2000
Australia
www.arup.com

ARUP

Contents

	Page
1 Introduction	1
2 Executive Summary	10
3 Proposed Fire Safety Design Approach	11
3.1 General	11
3.2 South Tower	12
3.3 Fire Safety Management & Maintenance	14
4 Agency Consultations	15
5 Conclusion	16
6 References	17

1 Introduction

This report supports a State Significant Development (SSD) Development Application (DA) (SSD DA) submitted to the Minister for Planning (Minister) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on behalf of Macquarie Corporate Holdings Pty Limited (Macquarie), who is seeking to create a world class transport and employment precinct at Martin Place, Sydney.

The SSD DA seeks approval for the detailed design and construction of the **South Site** Over Station Development (OSD), located above and integrated with Metro Martin Place station (part of the NSW Government's approved Sydney Metro project). The southern entrance to Metro Martin Place station and the South Site OSD above are located at 39-49 Martin Place.

This application follows:

- Approval granted by the Minister for a Concept Proposal (otherwise known as a Stage 1 SSDA) for two OSD commercial towers above the northern (North Site) and southern (South Site) entrances of Metro Martin Place station (SSD 17_8351). The approved Concept Proposal establishes building envelopes, land uses, Gross Floor Areas (GFA) and Design Guidelines with which the detailed design (otherwise known as a Stage 2 SSDA) must be consistent.
- Gazettal of site specific amendments to the Sydney Local Environmental Plan (LEP) 2012 (Planning Proposal reference: PP_2017_SYDNE_007_00) permitting greater building height (over a portion of the South Site) and additional floor space (over both the North and South Sites).

Lodged concurrently with this SSD DA, is a Stage 1 Amending SSD DA to the Concept Proposal (Stage 1 Amending DA), which seeks approval for an amended concept for the Metro Martin Place Precinct (the Precinct), aligning the approved South Site building envelope with the new planning controls secured for the Precinct.

To ensure consistency, the Stage 1 Amending DA must be determined prior to the determination of the subject Stage 2 SSD DA for the South Site.

This application does not seek approval for elements of the Metro Martin Place Precinct which relate to the Sydney Metro City and Southwest project, which is subject to a separate Critical State Significant Infrastructure (CSSI) approval. These include:

- Demolition of buildings on the North Site and South Site;

- Construction of rail infrastructure, including station platforms and concourse areas;
- Ground level public domain works; and
- Station related elements in the podium of the South Tower.

However, this application does seek approval for OSD areas in the approved Metro Martin Place station structure, above and below ground level, which are classified as SSD as they relate principally to the OSD. These components are within the Sydney Metro CSSI approved station building that will contain some OSD elements not already approved by the CSSI Approval. Those elements include the end of trip facilities, office entries, office space and retail areas, along with other office/retail plant and back of house requirements that are associated with the proposed OSD and not the rail infrastructure.

This report details the fire engineering brief for the South Tower developed to date in consultation with project stakeholders, including Sydney Metro and FRNSW.

Context

The New South Wales (NSW) Government is implementing Sydney's Rail Future (Transport for NSW, 2012), a plan to transform and modernise Sydney's rail network so that it can grow with the city's population and meet the needs of customers in the future.

Sydney Metro is a new standalone rail network identified in Sydney's Rail Future. The Sydney Metro network consists of Sydney Metro Northwest (Stage 1) and Sydney Metro City and Southwest (Stage 2).

Stage 2 of Sydney Metro entails the construction and operation of a new metro rail line from Chatswood, under Sydney Harbour through Sydney's CBD to Sydenham and onto Bankstown through the conversion of the existing line to metro standards. The project also involves the delivery of seven (7) new metro stations, including Martin Place.

This step-change piece of public transport infrastructure once complete will have the capacity for 30 trains an hour (one every two minutes) through the CBD in each direction catering for an extra 100,000 customers per hour across the Sydney CBD rail lines.

On 9 January 2017 the Minister approved the Stage 2 (Chatswood to Sydenham) Sydney Metro application lodged by Transport for NSW (TfNSW) as a Critical State Significant Infrastructure (CSSI) project (reference SSI 15_7400). Work is well underway under this approval, including demolition of buildings at Martin Place.

The OSD development is subject to separate applications to be lodged under the relevant provisions of the EP&A Act. One approval is being sought for the South Site – this application – and one for the North Site via a separate application.

Site Description

The Metro Martin Place Precinct project relates to the following properties (refer to Figure 1):

- 50 Martin Place, 9 – 19 Elizabeth Street, 8 – 12 Castlereagh Street, 5 Elizabeth Street, 7 Elizabeth Street, and 55 Hunter Street (North Site);
- 39 – 49 Martin Place (South Site); and
- Martin Place (that part bound by Elizabeth Street and Castlereagh Street).

This application relates **only to the South Site**, being the land at 39-49 Martin Place (refer to Figure 1).

The North Site is the subject of a Stage 2 SSD DA.



Figure 1: Aerial Photo of the North and South Site of the Metro Martin Place Precinct

Background

Sydney Metro Stage 2 Approval (SSI 15_7400)

The Sydney Metro CSSI Approval approves the demolition of existing buildings at Martin Place, excavation and construction of the new station (above and below ground) along with construction of below and above ground structural and other components of the future OSD, although the fit-out and use of such areas are the subject of separate development approval processes.

On 22 March 2018, the Minister approved Modification 3 to the Sydney Metro CSSI Approval. This enabled the inclusion of Macquarie-owned land at 50 Martin Place and 9-19 Elizabeth Street within Metro Martin Place station, and other associated changes (including retention of the opening to the existing MLC pedestrian link).

Concept Proposal (SSD 17_8351)

On 22 March 2018, the Minister approved a Concept Proposal (SSD 17_8351) relating to Metro Martin Place Precinct. The Concept Proposal establishes the planning and development framework through which to assess the detailed Stage 2 SSD DAs.

Specifically, the Concept Proposal encompassed:

- Building envelopes for OSD towers on the North Site and South Site comprising:
 - 40+ storey building on the North Site
 - 28+ storey building on the South Site (see Figure 2)
 - Concept details to integrate the North Site with the existing and retained 50 Martin Place building (the former Government Savings Bank of NSW)
- Predominantly commercial land uses on both sites, comprising office, business and retail premises
- A maximum total GFA of 125,437m² across both sites
- Design Guidelines to guide the built form and design of the future development
- A framework for achieving design excellence
- Strategies for utilities and services provision, managing drainage and flooding, and achieving ecological sustainable development
- Conceptual OSD areas in the approved Metro Martin Place Metro station structure, above and below ground level



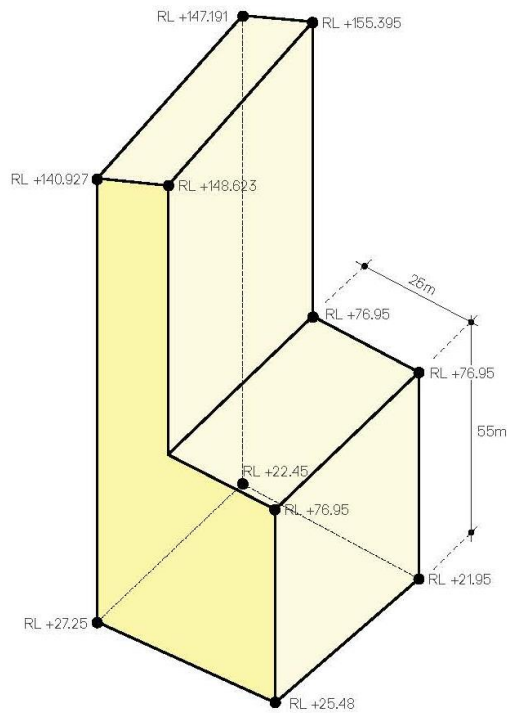
Figure 2: North Site and South Site Approved OSD Building Envelopes

Planning Proposal (PP_2017_SYDNE_007_00) - Amendment to Sydney LEP 2012

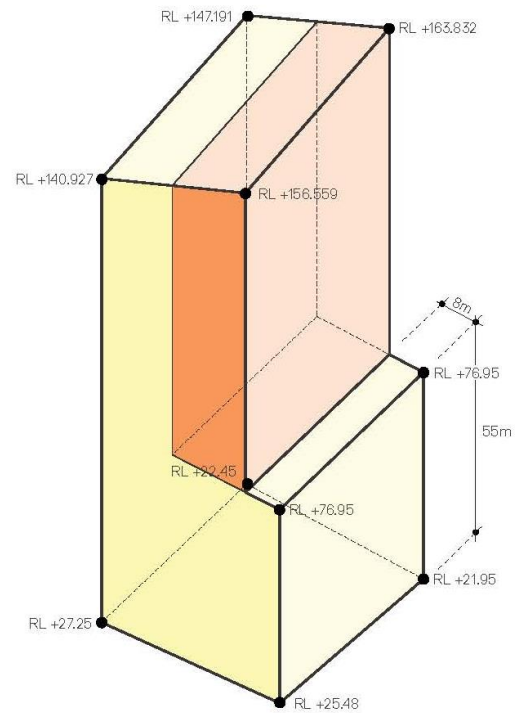
The Planning Proposal (PP_2017_SYDNE_007_00) sought to amend the development standards applying to the Metro Martin Place Precinct through the inclusion of a site-specific provision in the Sydney LEP 2012. This site-specific provision reduced the portion of the **South Site** that was subject to a 55 metre height limit from 25 metres from the boundary to Martin Place, to 8 metres, and applies the Hyde Park North Sun Access Plane to the remainder of the South Site, forming the height limit of the tower. It also permits a revised FSR of 22:1 on the South Site and 18.5:1 on the North Site. These amendments were gazetted within Sydney LEP 2012 (Amendment No. 46) on 8 June 2018 and reflect the new planning controls applying to the Precinct.

The Concept Proposal was prepared and determined prior to the site specific Sydney LEP 2012 amendment (PP_2017_SYDNE_007_00) being gazetted and was developed based on the height development standards that applied to the South Site at the time. As a result, the Concept Proposal allows for a tower on the South Site that is now inconsistent with the building envelope envisaged through the amendment to the Sydney LEP 2012. Accordingly, a Stage 1 Amending SSD DA to the Concept Proposal (Stage 1 Amending DA) has been lodged concurrently with this subject Stage 2 SSD DA, which seeks to align the approved Concept Proposal building envelope for the South Site with the revised site specific development standards applying under the Sydney LEP 2012, being increased FSR and building height. This Stage 1 Amending DA seeks to amend

the planning and development framework established under the approved Concept Proposal that is used to assess this Stage 2 SSD DA. The Stage 1 Amending DA is to be assessed concurrently with, and determined prior to the subject Stage 2 SSD DA, with the amended South Site building envelope setting the broad development parameters for the South Site (see Figure 3 below).



Approved South Site OSD Envelope



Proposed Amended South Site OSD Envelope (aligning with site specific amendment to Sydney LEP 2012)

Figure 3: Relationship between the approved and proposed amended South Site building envelope

Overview of the Proposed Development

The subject application seeks approval for the detailed design, construction and operation of the South Tower. The proposal has been designed as a fully integrated station and OSD project that intends to be built and delivered as one development, in-time for the opening of Sydney Metro City and Southwest in 2024. The application seeks consent for the following:

- The design, construction and operation of a new 28 storey commercial OSD tower (plus rooftop plant) within the approved building envelope for the South Site, including office space and retail tenancies.
- Vehicle loading within the basement levels.
- Extension and augmentation of physical infrastructure / utilities as required.
- Detailed design and delivery of ‘interface areas’ within both the approved station and Concept Proposal envelope that contain OSD-exclusive elements, such as office entries, office space and retail areas not associated with the rail infrastructure.

Planning Approvals Strategy

The *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD) identifies development which is declared to be State Significant. Under Schedule 1 and Clause 19(2) of SEPP SRD, development within a railway corridor or associated with railway infrastructure that has a capital investment value of more than \$30 million and involves commercial premises is declared to be State Significant Development (SSD) for the purposes of the EP&A Act.

The proposed development (involving commercial development that is both located within a rail corridor and associated with rail infrastructure) is therefore SSD.

Pursuant to Section 4.22 of the EP&A Act a Concept DA may be made setting out concept proposals for the development of a site (including setting out detailed proposals for the first stage of development), and for which detailed proposals for the site are to be the subject of subsequent DAs. This SSD DA represents a detailed proposal and follows the approval of a Concept Proposal on the site under Section 4.22 of the EP&A Act.

Figure 4 below is a diagrammatic representation of the suite of key planning applications undertaken or proposed by Macquarie and their relationship to the subject application (the subject of this report).

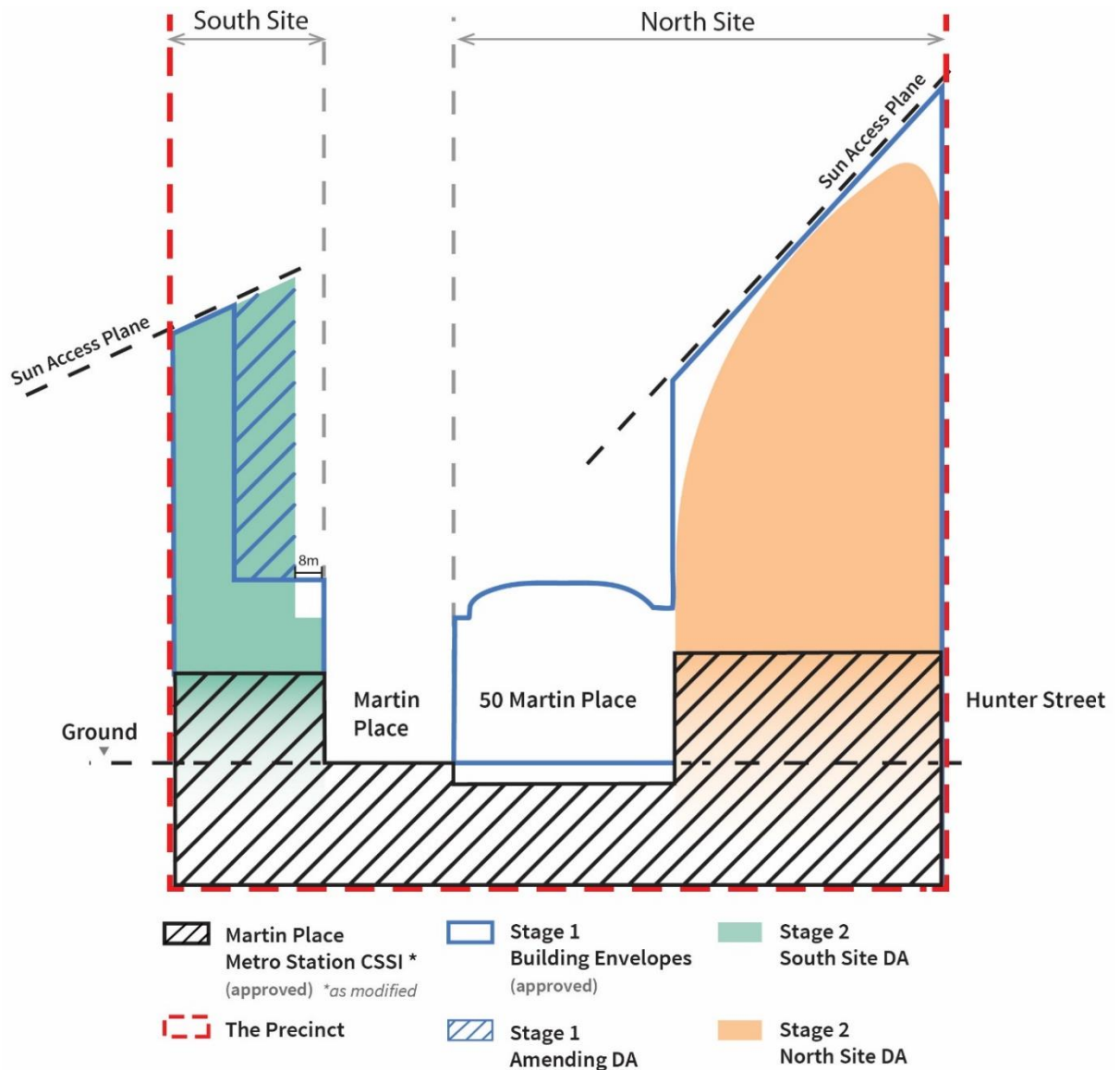


Figure 4: Relationship of key planning applications to the Stage 2 South Site DA (this application)

The Department of Planning and Environment have provided Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development. This report has been prepared having regard to the SEARs as follows:

During the preparation of the EIS, you are required to consult with the relevant local, State or Commonwealth Government authorities, service providers, and the local community. In particular, early consultation is required through meeting(s) with the Government Architect NSW, RMS, TfNSW (including Sydney Metro, Sydney Trains and Sydney Light Rail), Heritage Council of NSW, **Fire and Rescue NSW**, State Emergency Services and City of Sydney Council.

Furthermore, Condition B11 of the Development consent, Section 4.38 of the Environmental Planning and Assessment Act 1979, states:

Fire and Rescue NSW assessment

B11. Future Development Application(s) for the detailed building design shall be accompanied by a draft Fire and Rescue assessment / engineering brief, prepared in consultation with FRNSW, providing details of:

- the various sectors within the Martin Place Station Precinct served by independent fire systems (such as the over station development, underground metro sector, etc) – *refer to Section 3.2.*
- fire engineering analysis of the pedestrian connection interfaces between the sectors and the sectors themselves, having regard to emergency occupant egress, fire and smoke compartmentation, smoke hazard management and fire fighting intervention – *refer to Section 3.2.*
- adequacy of fire and life safety systems within the Martin Place Station Precinct in relation to the fire hazards associated with the Sydney Metro – *Not applicable to the South Tower as it is fire and smoke separated from the Metro Station development. This will be addressed in the Station Report.*
- design of fire hydrant systems for over station development that exceeds 135 m – *not applicable to the South Tower as it is less than 135m in effective height.*
- future consultation with Fire & Rescue NSW in respect of the final design and construction of the buildings and operational compatibility of the Martin Place Station Precinct's proposed fire and life safety systems – *refer to Section 3.2.*

Note, a draft Fire and Rescue assessment / engineering brief will be provided in the form of a Fire Engineering Brief Questionnaire. This submission can be made to FRNSW on receipt of a DA number.

2 Executive Summary

This fire and life safety report has been prepared on behalf of Macquarie, as part of the submission for a SSD DA for the proposed Sydney Metro Martin Place Integrated Station Development. This report sets out the primary aspects of the fire safety strategy that relate to planning and the approval of the SSD DA.

The fire safety design of the South Tower will generally satisfy the Performance Requirements of the Building Code of Australia (BCA)^[1] by complying with the Deemed-to-Satisfy (DtS) Provisions. However, there are some aspects of the design that are developed using performance based fire engineering to achieve compliance with the Performance Requirements of the BCA. Detailed assessments of these fire engineering Performance Solutions will be provided in subsequent reports following approval of the SSD DA.

Based fire engineering assessment to date, it is considered that there are no issues that would affect the building layout arising from fire safety and hence no impediments to the Consent Authority issuing development consent. Engagement with Fire and Rescue NSW (FRNSW) has been undertaken via a preliminary Fire Engineering Brief (FEB) meeting and they have not expressed any concerns with the proposed design. Further engagement will occur formally throughout the design process at FEB and at Construction Certificate stage.

3 Proposed Fire Safety Design Approach

3.1 General

Arup has been engaged by Macquarie Capital to develop a performance based fire safety strategy for the Sydney Metro Martin Place Station. The purpose of this Fire and Life Safety SSD DA Report is to provide an overview of the fire safety design of the proposed development, and specifically those aspects of the fire safety design that impact upon planning and hence are SSD DA related issues for the building.

Required fire safety measures are advised on a broad level, with more detail to be provided in subsequent Fire Engineering Briefs and Fire Engineering Reports as the design progresses. This report sets out the primary aspects of the fire safety strategy that relate to planning and the approval of the SSD DA.

The approach adopted by Arup is generally in accordance with the International Fire Engineering Guidelines (IFEG) ^[2] by adopting worldwide best practice and standards as outlined in Section 0.1.1 (of the IFEG). The document is used as general guidance on the analysis process without strictly following each individual sub-system as outlined in Section 1.3 of the IFEG which permits different approaches to demonstrate compliance. In addition, the approaches outlined in the earlier Fire Engineering Guidelines ^[3] as well as the Society of Fire Safety Code of Practice ^[4] are adopted where appropriate.

The design for the building will incorporate the prescriptive Deemed-to-Satisfy (DtS) Provisions of the BCA where appropriate. However, where the DTS provisions are either inappropriate, or prove overly onerous or restrictive to the design e.g. the station/retail areas, it will be demonstrated that the Performance Requirements of the BCA are achieved by a fire engineered Performance Solution. By satisfying the Performance Requirements of the BCA, an acceptable level of life safety will be achieved by the design. In addition, the fire safety strategy for the station portion of the development will also reference the Rail Safety National Law and the broadly used international fire safety guidance for rail fire safety, NFPA 130.

In relation to the strategies, criteria and methodologies to be applied, in principle agreement will be sought with project stakeholders and appropriate regulatory authorities regarding their applicability and suitability.

Arup makes all reasonable efforts to incorporate practical and advanced fire protection concepts into its advice. It is to be recognised, however, that fire protection is not an exact science, and that no building design can guarantee freedom from either ignition or fire damage.

3.2 South Tower

The South Tower development involves the construction of a new 29 storey Prime Grade commercial office building.

The main entrance to the building is from Martin Place at Elizabeth Street (Level 00) to the reception lobby at Mezzanine. Access to the main station entrance is provided at Castlereagh Street (Lower Ground) level via the escalators, access is also available from Elizabeth Street via a flight of stairs. It should be noted that the main station entrance is a double height space fully open to Castlereagh Street. Retail areas are proposed on Lower Ground, L00 and Mezzanine.

The commercial tower is proposed to largely comply with the BCA DtS Provisions, particularly for the required fire safety measures:

- The tower is served by two fire isolated stairs discharging direct to outside at Castlereagh Street and Elizabeth Street. The stairs are adequate in size for the anticipated occupant numbers in the building. The fire stairs serving the tower are independent to the fire stairs serving the underground station development.
- The Fire Resistance Levels (FRLs) of the construction elements are generally in accordance with the DtS Provisions of the BCA, other than retail areas, which have the potential to have a reduced FRL based on fire engineering analysis.
- The tower building shall be separated from the station building below via fire and smoke separation. These two buildings shall be considered as separate buildings under a performance solution. This allows for a fire incident in the station or North Tower to not have an adverse effect on the South Tower, and vice versa. This is to minimise disruption and impact on emergency services, and to keep the public transport system operating without disruption for incidents in the towers.
- A zone smoke control system to AS1668.1:2015 shall be provided to the commercial tower, except in areas where the compliant pressure differential may be difficult to achieve because of use and layout. This will be addressed with a performance solution.
- An automatic stair pressurisation system in accordance with AS1668.1:2015 shall be provided to the fire-isolated exit stairs that serve the commercial tower.
- Automatic light hazard sprinklers shall be provided throughout the building in accordance with BCA Clause E1.5, AS 2118.1:1999 and AS 2118.6:2012.
- A combined sprinkler and hydrant system is currently proposed. This would be designed in accordance with AS 2118.1:1999, AS 2118.6:2012 and AS 2419.1:2005. Hydrants shall be provided in all required fire-isolated stairs as required by AS 2419.1:2005. All fire hydrants shall be fitted with Storz couplings. Minor technical non-compliances related to the hydrant and sprinkler design may arise during the design to minimise complexity or increase functionality. These will be addressed as a Performance Solution. The tower and the underground station will have separate firefighting equipment

(i.e. each development will have their own boosters and hydrants). All underground areas will be protected by the underground station hydrants.

- It is anticipated that the fire strategy will require a smoke detection system in accordance with AS1670.1:2015 throughout the building to give flexibility for extended travel distances. Travel distances are anticipated to be in the order of:
 - 30m to a point of choice (in lieu of 20m); and
 - 50m to the nearest exit (in lieu of 40m).

A Performance Solution is proposed to justify these travel distances as they exceed the DtS limits.

- A Sound System and Intercom System for Emergency Purposes (SSISEP) shall be installed throughout the development in accordance with AS 1670.4:2015. As the tower and station are separately owned with their own operating systems, the intent is that the tower may remain operational if the station fire is remote from the tower. However, in the very unlikely event a fire in the station did grow out of control and smoke entered the tower, then the detection system contained therein should activate and trigger evacuation. The tower alarm system shall not cascade automatically to the station, in order to avoid disrupting the station unnecessarily (as the buildings are being designed not to spread fire and smoke between them). The activation of fire detectors in the office areas shall trigger a cascading evacuation regime up the tower.
- Fire hose reels in accordance with BCA Clause E1.4 and AS 2441:2005 shall be installed throughout the building. In achieving compliant coverage, fire hose reels may not pass through fire or smoke doors.
- Fire extinguishers shall be provided in accordance with BCA E1.6 and AS 2444:2001, particularly where a water-based firefighting medium is inappropriate.
- Emergency lifts shall be installed in accordance with BCA Clause E3.4, as the effective height of the building is more than 25m.
- Fire booster cabinet shall be located at Elizabeth Street, in lieu of the Martin Place tower entrance. This will be addressed as a Performance Solution, and has been discussed with Fire and Rescue NSW.
- The fire control room shall be located on L00 within the building. Access to the fire control room is provided via the main lobby entrance and directly from Elizabeth Street. At each fire control room (South Tower and station), fire mimic panels would be provided such that any alarm in the South Tower would also be displayed in the mimic panel in the station fire control room, and vice versa, i.e. there would be full communication between the South Tower and station systems.

The fire strategy for the tower will be developed further into a Fire Engineering Brief Questionnaire report / Fire Engineering Report for future consultation with FRNSW regarding the final design and construction of the building.

3.3 Fire Safety Management & Maintenance

It should be noted that the maintenance of fire and other safety systems is a mandatory requirement for building owners under the provisions of the Environmental Planning and Assessment Act 1979 and the Environmental Planning and Assessment Regulation 2000.

All fire safety measures required by relevant Deemed-to-Satisfy provisions or the Performance Solutions are considered to be essential to the performance of the Building Solution and must be maintained so that they are capable of operation in the event of fire in accordance with the standard to which they were originally designed and installed. AS1851 is recommended to be followed for all fire safety features of the building.

The building is required to be managed under a fire safety policy which includes:

- A fire safety management plan in accordance with AS3745; including procedures for the safety of people in buildings, structures and workplaces during emergencies, the appointment of an Emergency Planning Committee and setting up of an Emergency Control Organization.
- Good house-keeping and fire prevention procedures such as maintaining clear evacuation routes.
- Regular maintenance of all fire safety systems as outlined above.

4 Agency Consultations

FRNSW have been consulted throughout the design process with specific items such as hydrant design being resolved through multiple engagements.

FRNSW were briefed on the Metro Martin Place SSD DA submission on 31 May 2018 and raised no objections to the proposed submission strategy.

5 Conclusion

Based on review of the South Tower design, and consultations held with FRNSW, it is appropriate that performance based fire engineering can be used to demonstrate compliance with the Performance Requirements of the BCA.

Non-compliances the DtS Provisions of the BCA may be identified as the design further develops that will require additional Performance Solutions. However, it is not considered likely that these Performance Solutions will materially affect the South Tower SSD DA design.

6 References

- [1] Australian Building Codes Board. National Construction Code Series – Building Code of Australia - Class 2 to Class 9 Buildings – Volume One. Australian Building Codes Board, Canberra ACT, Australia
- [2] Australian Building Codes Board (2005). International Fire Engineering Guidelines – Edition 2005. Australian Building Codes Board, Canberra ACT, Australia
- [3] Fire Code Reform Centre (1996). Fire Engineering Guidelines – First Edition. Fire Code Reform Centre Limited, Sydney NSW, Australia.
- [4] Engineers Australia Society of Fire Safety (2003). Code of Practice for Fire Safety Design, Certification & Peer Review in accordance with the Building Code of Australia. Engineers Australia Society of Fire Safety, Australia
- [5] NFPA130, Standard for Fixed Guideway Transit and Passenger Rail Systems, 2014 Edition.
- [6] Rail Safety National Law (NSW) Act 2012, No 82a.