

Macquarie

**Sydney Metro Martin Place
integrated station development**

**North Tower, SSD DA Stage 2:
Security Risk Assessment Report**

CSWSMP-MAC-SMN-SC-REP-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

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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 **North 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 northern entrance to Metro Martin Place station will front Hunter Street, Elizabeth Street and Castlereagh Street, with the North Site OSD situated above.

This application follows the approval granted by the Minister for a Concept Proposal (otherwise known as a Stage 1 SSD DA) for two OSD commercial towers above the northern and southern 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 SSD DA) must be consistent. This application does not seek approval for elements of the Metro Martin Place Precinct (the 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 North 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 provides an overview of the identified security risks for the Metro Martin Place development. Furthermore, this report covers the Crime Prevention Through Environmental Design (CPTED) assessment undertaken for the development.

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 North Site – this application – and one for the South Site via a separate application.

Site Description

The Metro Martin Place Precinct 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 North Site**, being the city block bounded by Hunter Street, Castlereagh Street, Elizabeth Street, and Martin Place (refer to Figure 1).

The South Site (39 – 49 Martin Place) is the subject of a separate 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 (see Figure 2)
 - 28+ storey building on the South Site
 - 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 level¹

¹ Refers to those components within the Metro CSSI approved station envelope that will contain some OSD elements not approved in the CSSI consent. 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.

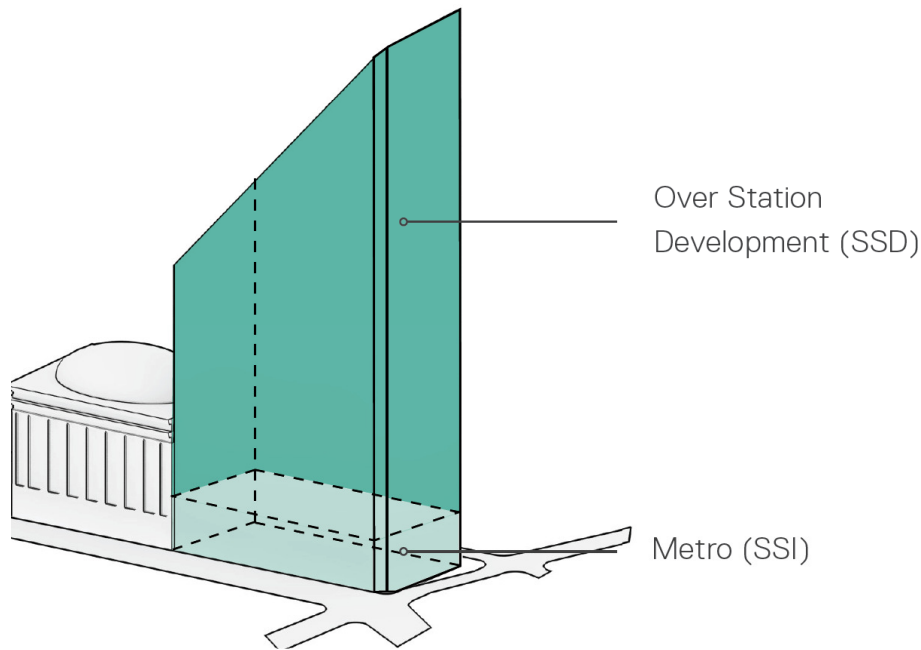


Figure 2: North Site Approved OSD Building Envelope

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 Local Environmental Plan (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.

Overview of the Proposed Development

The subject application seeks approval for the detailed design, construction and operation of the North 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. This application seeks consent for the following:

- The design, construction and operation of a new 39 storey commercial OSD tower (plus rooftop plant) within the approved building envelope for the North Site, including office space and retail tenancies.
- Physical connections between the OSD podium and the existing 50 Martin Place building, to enable the use of the North Site as one integrated building.

- Vehicle loading areas 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 end of trip facilities, 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.

Submitted separately to this SSD DA is a SSD DA for the South Site (Stage 2 South Site SSD DA). A Stage 1 Amending SSD DA to the Concept Proposal (Stage 1 Amending DA) has also been submitted that has the effect of aligning the approved South Site envelope with the new planning controls established for the South Site (achieved through the site specific amendment to the Sydney LEP 2012).

Figure 3 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).

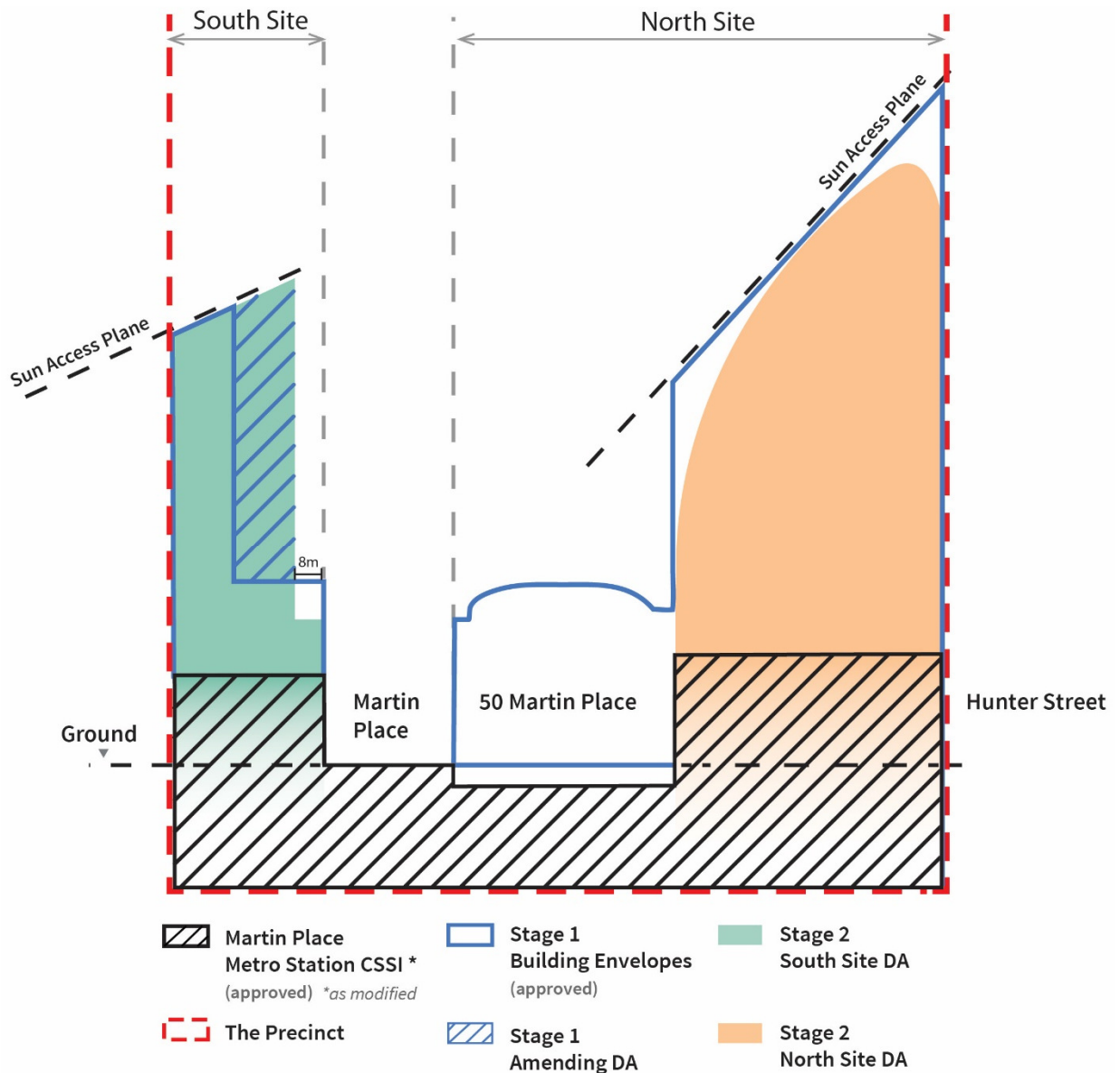


Figure 3: Relationship of key planning applications to the Stage 2 North Site DA (this application).

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:

The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the EP&A Regulation 2000. Provide these as part of the EIS rather than as separate documents.

In addition, the EIS must include the following:

- CPTED assessment (including a safety and security assessment).

Furthermore, Condition B10 of the Development consent, Section 4.38 of the Environmental Planning and Assessment Act 1979, states:

- **Security assessment**

B10. The Applicant shall provide a security risk assessment report with any Future Development Application(s). This shall be prepared having regard to the NSW Police Publication 'Safe Places' Comprehensive Guide for Owners, Operators and Designers for protecting public places from terrorism and CPTED in consultation with NSW Police and TfNSW. These reports shall include, but not be limited to, details of:

- threat environment or vulnerabilities
- blast modelling and appropriate mitigation
- counter terrorism measures
- preferred lighting standards
- the performance of glazing elements for occupant protection from blast loads
- potential vehicle incursions into pedestrian spaces and measures to prevent vehicle incursions.

The applicant shall consult with the Sydney Coordination Office within TfNSW during all stages of the project to review security and risk management process and related documentation and plans.

It is noted that some security information has not been included in this report due to its sensitive nature and the possibility of impacting the security of the site. The report provides an overview of the security strategy and risk assessment, but does not detail each individual risk item identified for the project.

2 Security Risk Assessment (Extract)

2.1 Executive Summary

This report is an extract from the Security Risk Assessment produced for the Metro Martin Place Precinct, providing an overview of the identified security risks for the development. This extract report has been produced to satisfy Condition B10 of the Section 89E of the Environmental Planning and Assessment Act 1979;

- **Security assessment**

B10. The Applicant shall provide a security risk assessment report with any Future Development Application(s). This shall be prepared having regard to the NSW Police Publication ‘Safe Places’ Comprehensive Guide for Owners, Operators and Designers for protecting public places from terrorism and Crime Prevention Through Environmental Design (CPTED) in consultation with NSW Police and TfNSW. These reports shall include, but not be limited to, details of:

- threat environment or vulnerabilities – detailed in the Metro Martin Place Security Risk Assessment
- blast modelling and appropriate mitigation – detailed in the Metro Martin Place station Blast Assessment
- counter terrorism measures – detailed in the Metro Martin Place Security Risk Assessment
- preferred lighting standards – detailed in the Metro Martin Place Security Risk Assessment and documented in the Metro Martin Place Electrical Services Specification
- the performance of glazing elements for occupant protection from blast loads – detailed in the Metro Martin Place North Tower SSDA Blast Assessment Report
- potential vehicle incursions into pedestrian spaces and measures to prevent vehicle incursions – detailed in the Metro Martin Place Security Risk Assessment

Furthermore, this report covers the CPTED assessment undertaken for the Metro Martin Place Precinct.

2.2 Qualifications

It should be noted that this SRA is limited to the immediate development of the Metro Martin Place Precinct and does not cover the surrounding area in detail.

2.3 Definition of Risk

For this SRA, the standard risk management definition, as defined in *ISO 31000 – Risk Management*, has been used.

Risk has been defined as:

$$\text{Risk} = \text{Consequence} \times \text{Likelihood}$$

Where:

- **Risk** is a combination of the consequences of an event and the associated likelihood of occurrence;
- **Consequence** is the outcome of an event affecting objectives; and
- **Likelihood** is the chance of something happening.

2.3.1 Risk Assessment Matrices

The security risk rating matrix and security risk tolerance definitions detailed below have been used as part of this security risk assessment process, and have been derived from the *HB167 Security Risk Management Handbook*.

2.3.2 Security Risk Rating Matrix

	Consequence				
Likelihood	Minimal	Minor	Moderate	Major	Catastrophic
Almost Certain	Medium	Medium	High	Extreme	Extreme
Likely	Medium	Medium	Medium	High	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

2.3.3 Security Risk Tolerance Definitions

Classification	Risk Tolerance	
Extreme	Unacceptable	Extreme risks are regarded as unacceptable where the risk cannot be justified, except in extraordinary circumstances.
High	May be Tolerable	High risks may be tolerable only if further risk reduction is impracticable (for example because of cost benefit considerations or an absence of a feasible solution).
Medium	Tolerable	Medium risks are regarded as tolerable only if further risk reduction is impracticable (for example because of cost benefit considerations or an absence of a feasible solution).

Low	Broadly Acceptable	Risks with this ranking are considered to be broadly acceptable, where risk reduction is not likely to be required as any benefits realised are likely to be outweighed by costs. These risks will be treated where reasonable and practical.
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2.4 Identified Risks

Security risks were identified for each phase of the project, being split in to delivery phase security risks and the operations phase security risks; for both the OSD and Metro Martin Place station.

166 security risks were identified over both phases of the project.

2.4.1 Delivery Phase

Of the 76 security risks that were identified for the delivery phase, 2 were assessed as Extreme, 15 were assessed as High, 48 were assessed as Medium, and 11 were assessed as Low. 16 of the 48 Medium security risks have a likelihood rating of Almost Certain or Likely, but a consequence rating of Minor or Minimal, which are the two lowest consequence ratings. Therefore, any proposed security treatment measures should focus on reducing their likelihood of occurrence.

43 of the 76 total security risks identified for this phase have consequence ratings of Moderate or above, with 40 of the 44 have likelihood ratings of Possible or below and 4 having a likelihood rating of likely. Therefore, any proposed security treatment measures should focus on reducing their consequence rating, with a few risks being targeted for a reduction in likelihood.

Importantly, 17 of the identified security risks are both High Consequence (Catastrophic, Major or Moderate) and High Likelihood risks (Almost Certain, Likely, or Possible). These risks should be targeted for priority treatment. The assessed Extreme and High risks should be prioritised, however as the predominance of the High risks are terrorist based risks that have been assessed as Rare or Unlikely, reasonable measures should only be implemented where practical.

2.4.2 Operations phase

Of the 90 security risks that were identified for the operations phase, 2 were assessed as Extreme, 13 were assessed as High, 54 were assessed as Medium, and 21 were assessed as Low. 23 of the 54 Medium security risks have a likelihood rating of Almost Certain or Likely, but a consequence rating of Minor or Minimal, which are the two lowest consequence ratings. Therefore, any proposed security treatment measures should focus on reducing their likelihood of occurrence.

43 of the 88 total security risks identified for this phase have consequence ratings of Moderate or above; 39 of the 43 have likelihood ratings of Possible or below, with 4 having a likelihood rating of Likely. Therefore, any proposed security

treatment measures should focus on reducing their consequence rating, with a few risks being targeted for a reduction in likelihood.

Importantly, **14** of the identified security risks are both high consequence (Catastrophic, Major or Moderate) and high likelihood risks (Almost Certain, Likely, or Possible). These risks should be targeted for priority treatment. The assessed Extreme and High risks should be prioritised, however as the predominance of the High risks are terrorist based risks that have been assessed as Rare or Unlikely, reasonable measures should only be implemented where practical.

2.4.3 Recommended Treatment Measures

Security mitigation measures to reduce the identified security risks So Far As Is Reasonably Practicable (SFAIRP) have been incorporated in the design, including:

- Design measures, such as CPTED;
- Physical security measures;
- Hostile vehicle mitigation measures;
- Electronic access control;
- CCTV;
- Intruder alarm systems (including duress);
- Intercoms;
- A security monitoring centre;
- On-site security officers; and
- Operational security measures including a security plan and Security Operating Procedures.

2.4.4 Blast Modelling & Structural Mitigation

The structural performance of the North and South Towers was assessed in response to the Sydney Metro Scope of Works and Technical Criteria (SWTC) Appendix 22 that noted that: *“DevCo must design the underground and open cut station so that in the event of a blast, the loss of a support element will not result in progressive collapse of the structure. A risk analysis must be undertaken to identify potential threats and mitigation measures must then be developed to address these.”*

The structural design of the two towers was assessed when subjected to Vehicle-Borne Improvised Explosive Device (VBIED) and Person-Borne Improvised Explosive Device (PBIED) threats located within publically accessible areas of the stations and suitable enhancements were made to ensure that progressive collapse did not occur. The full assessment is detailed in Metro Martin Place Station Blast Requirements Report (CSWSMP-MAC-SMP-ST-REP-999902).

The blast modelling and structural mitigation strategy was informed by the following documents:

- New South Wales Counter Terrorism Plan (December 2013);
- Safe Places Vehicle Management – A Comprehensive Guide for Owners, Operators and Designers (2012);
- ANZCTC National Guidelines for Protecting Critical Infrastructure from Terrorism (2015);
- NCTC National Guidelines for the Protection of Places of Mass Gathering from Terrorism (2011); and
- ANZCTC Improvised Explosive Device (IED) Guidelines for Places of Mass Gathering (2016).

The following additional international documentation was consulted during the assessment of structural performance:

- American Society of Civil Engineers, ASCE/SEI 59-11, Blast Protection of Buildings, 2011;
- Joint Departments of the Army, Air Force, and Navy and the Defense Special Weapons Agency, UFC 3-340-01, Design and Analysis of Hardened Structures to Conventional Weapons Effects, 2002;
- U.S. Army Corps Of Engineers, Naval Facilities Engineering Command, Air Force Civil Engineer Support Agency, UFC 3-340-02, Structures To Resist The Effects Of Accidental Explosions, 2014.
- Department of Homeland Security, Science and Technology Directorate, Infrastructure Protection and Disaster Management Division, FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings, 2011; and
- The Institution of Structural Engineers, Manual for the systematic risk assessment of high-risk structures against disproportionate collapse, IStructE Ltd, 2013.

No specific threats or performance criteria were provided to the design team for the purposes of achieving the B10 condition. The design team have therefore developed design basis threats and performance criteria for the purposes of the structural assessment.

Design Basis Threats

Design basis threats (DBTs) were developed based upon a review of relevant international rail and those used most recently for domestic Australian projects. Projects consulted for the development of DBTs included:

- USA 1: A major rail transit hub located in the Eastern United States;
- USA 2: A multi-modal (including rail) transit hub located in the Western United States;
- Australia 1: A rail project in an Eastern Australian city;

- Australia 2: A critical rail control facility in an Eastern Australian city;
- Crossrail: A cross London rail project;
- Kings Cross Station: A new rail surface development;
- UK 3: An underground rail project in the United Kingdom.

From this review, the following DBTs were used for the structural blast assessment:

- Person-Borne Improvised Explosive Devices (PBIED) – a suicide vest with associated fragmentation located in any publically accessible area of the station.
- Hand-Emplaced Improvised Explosive Devices (HEIED) – a suitcase located in any publically accessible area of the station.
- Vehicle-Borne Improvised Explosive Devices (VBIED) (unscreened) – a “car bomb” located in unscreened, accessible areas.
- VBIED (screened) – concealed “car bomb” located in screened, accessible areas.

Note that modelling of blast pressures and impulses was undertaken using scaled distance relationships outlined in UFC 3-340-02.

Performance Criteria

Performance criteria for the structure were developed following guidance provided in:

- ANZCTC Improvised Explosive Device (IED) Guidelines for Places of Mass Gathering (2016), and;
- Project Scope of Works & Technical Criteria (SWTC) Appendix 22.

These state, respectively, that “*limit damage to structures and people by preventing disproportionate or progressive collapse of buildings*” and “*DevCo must design the underground and open cut station so that in the event of a blast, the loss of a support element will not result in progressive collapse of the structure. A risk analysis must be undertaken to identify potential threats and mitigation measures must then be developed to address these.*”

Therefore the performance of the structure was assessed against a “no progressive” collapse performance criterion when subjected to the blast loads generated by the defined design basis threats.

This may be achieved via two mechanisms:

- **Key Element Design:** Elements that, if lost, would result in a progressive collapse are strengthened to withstand the applied blast loads (threat dependent), or;
- **Alternative Load Path Design:** The structure is designed with sufficient redundancy to allow damage caused by blast threats to be accommodated without causing a progressive collapse (threat independent).

In general, the key element design approach is adopted for elements subjected to blast threats.

2.4.5 Glazing Performance & Occupant Protection Under Blast Loads

The glazing performance and occupant protection assessment was informed by the following documents:

- New South Wales Counter Terrorism Plan (December 2013);
- Safe Places Vehicle Management – A Comprehensive Guide for Owners, Operators and Designers (2012);
- ANZCTC National Guidelines for Protecting Critical Infrastructure from Terrorism (2015);
- NCTC National Guidelines for the Protection of Places of Mass Gathering from Terrorism (2011);
- U.S. Army Corps Of Engineers, PDC-TR 10-02, Blast Resistant Design Methodology For Window Systems Designed Statically And Dynamically (2012);
- ASTM International, ASTM F1642-12, Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings (2012);
- US General Services Administration (GSA), Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings (2003);
- Interagency Security Committee (ISC), The Risk Management Process: An Interagency Security Committee Standard (2017);
- ANZCTC Improvised Explosive Device (IED) Guidelines for Places of Mass Gathering (2016); and
- CPNI Guidance Note: Measures to Improve the Blast Resistance of Glazing (2014).

No specific threats or performance criteria were provided to the design team for the purposes of achieving the B10 condition. The design team have therefore developed design basis threats and performance criteria for the purposes of the glazing assessment.

Design Basis Threats

Blast threats are identical to those defined for the structural assessment above.

Performance Criteria

As no specific criteria are provided in documentation produced by Australian agencies, the performance of the façade was evaluated against relevant global benchmarks

- **United States Interagency Security Committee:** For low and medium level importance (FSL II & III) structures, the Interagency Security Committee (ISC) recommends that preferred glazing systems are used in the design of the building envelope. Preferred glazing systems include: thermally tempered heat strengthened or annealed glass with fragment retention film installed on the interior surface and attached to the frame, laminated thermally tempered, laminated heat strengthened, or laminated annealed glass. High and very high importance (FSL IV & V) structures are required to achieve performance condition 3b over 90% of the structure under the loads generated by the detonation of the design basis threat.
- **United States General Services Administration:** The standard General Services Administration (GSA) test level for façade design (level C) requires that glazing systems achieve performance condition 3b under a load of 4psi/28psi-ms (27.6kPa/193kPa-ms).
- **CPNI Glazing Guidance:** The guidance provided by CPNI recommends the use of laminated glass in normal frames mitigate the effects of blast. The guidance recommends a minimum glass thickness of 6.8mm (including a 0.76mm thick polyvinyl butyral (PVB) interlayer). Additionally, the guidance for blast resistant glazing recommends that glass be bonded to its framing used structural silicone.

Tower Façade Systems

The North Tower glazed façades are constructed from commercially available unitised curtain walling systems.

Conclusion

While significant glazing damage is expected in the event of a VBIED blast, the extent of damage predicted is in-line with that permitted within standards provided by the United States Government. Additionally, the façade construction adopts the principles of blast mitigation outlined in CPNI and U.S. guidance.

3 Agency Consultations

The Metro Martin Place team met with the New South Wales Police Counter Terrorism and Command Unit on 30 May 2018 to provide a brief on the upcoming Stage 2 SSDA submission; a follow-up meeting occurred on 07 June 2018. The contents of this report were discussed and the following points were raised and addressed in the two meetings:

- Methodology used in the Security Risk Assessment – Arup explained that the ISO31000:2009 and HB167 Standards were the baseline of the Security Risk Assessment (SRA) methodology
- Basis of the blast analysis and modelling – Arup explained that the following projects were consulted to inform the basis of the blast analysis and modelling:
 - USA 1: A major rail transit hub located in the Eastern United States;
 - USA 2: A multi-modal (including rail) transit hub located in the Western United States;
 - Australia 1: A rail project in an Eastern Australian city;
 - Australia 2: A critical rail control facility in an Eastern Australian city;
 - Crossrail: A cross London rail project;
 - Kings Cross Station: A new rail surface development; and
 - UK 3: An underground rail project in the United Kingdom.
- Emergency services vehicular access in to the site – Arup covered the details of how the project has accommodated for this access

All design basis risks, threats and relevant mitigation measures were agreed in principle

4 Conclusion

The Security Risk Assessment identifies potential risks and their associated likelihoods and consequences. The design has considered these risks and incorporated mitigation measures to reduce the risk likelihood and consequence SFAIRP.

In the absence of specific blast criteria issued by the Department of Planning and Environment, the North Tower has undergone blast modelling analysis to assess blast damage in accordance with Australian and international standards and guidelines, and has been compared against international projects of similar scale and profile. Results of the analysis show that the design is capable of withstanding blast in accordance with criteria identified, and no further blast mitigation measures are required.

Appendix A

Crime Prevention Through Environmental Design Report

Macquarie

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1 Introduction

1.1 Report Version

*This report is the version of the Crime Prevention Through Environmental Design (CPTED) Report that was submitted with the EIS for the **North Site Over Station Development (OSD)**. It has been augmented, having regard to the submissions received to the exhibition of the EIS.*

The table below provides a summary of the relevant comments received, along with the sections where they have been addressed in the report. Where sections of the report have been edited, or where new sections have been included, the relevant text is highlighted in italics.

1.2 Summary Table of Comment Responses

<i>Agency</i>	<i>Comment</i>	<i>Section Evidenced</i>
<i>Department of Planning and Environment (DPE)</i>	<i>Provide details on security and operation of the proposed through site links and the lobby areas of the over station development and address:</i>	<i>NA</i>
<i>DPE</i>	<i>a) hours of operation of publicly accessible areas</i>	<i>Section (S) 6.1.1, Paragraph (P) 2, 4 S 6.1.3, P 2</i>
<i>DPE</i>	<i>b) sightlines and passive/active surveillance of through site links, lift lobbies, visual connection from Martin Place and the streets to retail spaces and publicly accessible areas</i>	<i>S 2.2, P 45 S 6.1.1, P 1, 2, 3, 5, 6</i>
<i>DPE</i>	<i>c) consider the use of spatial design and visual cues to delineate semi-private/secured access to office towers from retail spaces and publicly accessible areas as preferred options over potential security barriers</i>	<i>S 2.2, P 2 S 6.1.2, P 2 S 6.1.4, P 2</i>

1.3 Aim of this Report

This report is designed to inform the project team on how Crime Prevention Through Environmental Design (CPTED) may be applied to the development. The report will outline the project, policy, and crime context for the project and make recommendations about appropriate CPTED strategies to reduce the opportunity for crime to occur.

1.4 Methodology

In preparing this report, Arup has undertaken the following:

- Review of CPTED theory and how this can be typically applied to projects of this type.
- Collection and analysis of local and state crime statistics, obtained from open sources such as the Bureau of Crime Statistics and Research (BOCSAR), to better understand the external security environment.
- Collection and analysis of local demographic statistics, obtained from open sources from the Australian Bureau of Statistics (ABS), to better understand the external environment.
- Review the current architectural plans and relevant reports with an emphasis on the interfaces between the public domain, the North Tower and station infrastructure.
- Conduct a detailed CPTED review and detail the CPTED strategies, including providing detailed findings and recommendations.

2 Executive Summary

This report is designed to inform the project team on how Crime Prevention Through Environmental Design (CPTED) may be applied to the development. The report will outline the project, policy, and crime context for the project and make recommendations about appropriate CPTED strategies to reduce the opportunity for crime to occur.

2.1 Crime Context

A review of crime occurring in the area surrounding the Metro Martin Place (i.e. the City of Sydney Local Government Area (LGA)) was conducted to identify relevant trends. The majority of crimes relevant to the Metro Martin Place Integrated Station Development (ISD) have been decreasing over the last five years, with trespass and transport regulatory offences increasing within the Sydney Central Business District (CBD).

Table 1: Five-year crime tend for the City of Sydney LGA (Bureau of Crime Statistics and Research (BOCSAR))

Trend information	2011	2012	2013	2014	2015	24mnth Trend	60mnth Trend
Steal from person	2881	2736	2225	1887	1661	-11.98	-42.35
Harassment, threatening behaviour and private nuisance	973	1023	1025	950	939	-1.16	-3.49
Transport regulatory offences	2382	3172	4948	3942	8755	122.1	267.55
Assault – non-domestic violence related	3772	3724	3576	3142	3121	-0.67	-17.26
Malicious damage to property	3599	3332	3343	2876	2691	-6.43	-25.23
Offensive conduct	1860	1682	1713	1318	1126	-14.57	-39.46
Steal from retail store	2290	2462	2276	2318	2185	-5.74	-4.59
Trespass	449	560	477	508	502	-1.18	11.8
Steal from motor vehicle	2713	2200	2351	2176	1686	-22.52	-37.85
Break and enter non-dwelling	807	819	934	590	450	-23.73	-44.24

2.2 Recommendations

Based on a design assessment and review of crime statistics for the LGA, several recommendations have been made, including:

- Provide clear definition and designation of space in a manner that encourages and predicts authorised movement and does not cause conflict between the intended purpose of the space and the desired behaviour. This

has been achieved through early design input in to the North Tower, where demarcation and signage was advised on.

- Maximise *pedestrian* circulation areas by minimising built structures and avoiding clutter, particularly along pedestrian routes within the North Tower that lead to the Station Concourse areas. This has been achieved through consultation with the relevant architects, and providing input in to the open-space design of these routes.
- Design and layout of building entrances and foyers to assist natural surveillance by reducing clutter and blind spots, positioning reception/concierge where they have clear sightlines of entrances, the general foyer areas, and waiting areas. This has been achieved by positioning the North Tower security line in front of the reception area, giving the concierge service the ability to have direct view of the entrance and exit points, as well as the general *pedestrian circulation areas*.
- Use of glass partitions wherever possible to improve sight lines and the transmission of natural light. The partitions are to be fitted with anti-graffiti coatings (where practical) where these partitions are accessible to the public.
- Durable public furniture and amenity construction, to limit damage and subsequent repairs over the life of the facility.
- The mixed-use areas will help ensure regular and diverse use of the facility. This also enhances the territoriality aspects of the site, whilst enhancing the opportunity for natural surveillance. Encouraging regular and diverse use of the site through these, and other, measures have been recommended to the owners and operators of the North Tower.
- Adequate lighting has been provided throughout the site.
- Control points between each external interface point and the site *are to be* defined, heightening surveillance throughout the site.
- Ensuring public realm lighting is appropriate for use at night.
- Provide signage throughout the precinct to remove excuses for loitering and littering, each being a significant detractor to territoriality. This has been advised and will be implemented by the relevant architect in the next phase of the design.
- Ensure signage is appropriate to improve wayfinding and reduce terrain vagueness. This has been advised and will be detailed in the next phase of the design.

Implementing these recommendations will increase the perception of risk to potential criminals by increasing the presence of deter, detect, delay and response characteristics (*via* physical and electronic security systems) to the ISD. Further, such measures will increase the effort required to commit crime by increasing the time, energy or resources which need to be expended while reducing the potential rewards of crime by minimising, removing and concealing rewards.

3 Underlying Principles

3.1 Overview

CPTED is the use of design and space management principles to influence human behaviour. CPTED is a crime prevention strategy based on the proper planning, design and structure of cities, neighbourhoods, precincts or individual sites to create an effective use of the built environment which can lead to a reduction in the fear and incidence of crime, as well as an improvement in quality of life.

The design of a space needs to ensure that the intended activity can be properly carried out, as well as directly support the control of behaviour to reduce the opportunity for crime. The design of the North Tower, as well as the wider ISD, should strive to incorporate the three overlaying CPTED strategies – Natural Access Control, Natural Surveillance and Territorial Reinforcement (refer Figure 1).

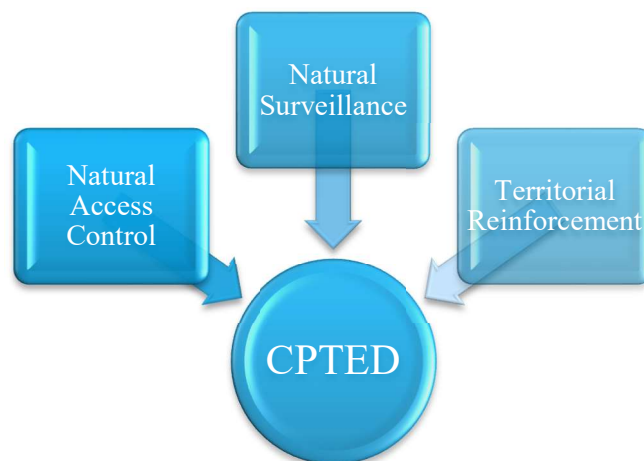


Figure 1: Crime Prevention through Environmental Design (CPTED)

3.2 Natural Access Control

Natural access control involves decreasing opportunities for crime by controlling access to a potential target and by creating a perception of risk to an offender. Physical and symbolic barriers can be used to attract, channel or restrict the movement of people.

Effective natural access control can be achieved by creating:

- Designed landscapes and physical locations e.g. footpaths that direct pedestrians into and throughout target areas. The North Tower has achieved this by creating a clear demarcation between the North Site and the thoroughfare to the station platforms.

- Public spaces which attract people into the area and discourage intruders. This is achieved in the North Tower by the security line partition and the presence of concierge / front of house staff.
- Restricted access to internal areas or *high-risk areas*, and other rarely visited areas. Such areas throughout the North Tower *are to be* appropriately access controlled and are *to be* provisioned to have CCTV coverage.
- Selectively placed entrances and exits, lighting and landscaping to control the flow of access or to limit access. Areas throughout the North Tower have been identified as either public, semi-public or private. Based on this demarcation, lighting, signage and landscaping has been designed to either encourage or discourage the use of such space.

Where practical, these natural access control measures have been incorporated into the design of the North Tower.

3.3 Natural Surveillance

Natural surveillance seeks to create environments that keep intruders under observation. It aims to provide opportunities for people engaged in their normal daily business to observe the space around them.

Natural surveillance means creating clear sightlines. The placement of physical features, activities and people are designed to encourage maximum visibility and positive interaction amongst legitimate users of the space.

This can be achieved by considering the following design principles:

- Streets and public spaces can be observed from nearby buildings;
- Clear sightlines exist between public and private places;
- Open plan and minimalist (clutter-free) designs;
- Effective lighting of public places is adopted;
- Spots that facilitate entrapment are eliminated;
- Attractive and well-maintained landscaping, with proper light and clear sight lines are used to prevent offenders from finding a place to hide or entrap victims; and
- Activation of the space or surrounding areas that encourages regular and diverse use of the space.

These natural surveillance design principles have been recommended to the operator of the North Tower, and are subject to ongoing coordination and detailing, including through operational procedures.

3.3.1 Territoriality

Territoriality or territorial reinforcement seeks to clearly define private space from semi-public and public space, and attract legitimate users to an area to create a

sense of ownership. This signals that the owner has a vested interest in the location, and increases the actual and perceived risk of detection to offenders.

Change in pavers, signage, lighting and landscaping can be used to define public, semi-public and private space. Care is necessary to ensure that territorial reinforcement does not redefine public spaces into private spaces through gates and enclosures.

Territorial reinforcement can be achieved through:

- Design with a clear distinction between public and private spaces by using physical barriers and symbolic barriers (e.g. vegetation);
- Design that encourages people to gather in a public space and to feel a sense of responsibility for its use and condition;
- Environmental markers (e.g. signage, walkways, pavers, lighting, bollards) which define intended use and ownership; and
- Regular maintenance of vegetation, infrastructure and prompt removal of graffiti and vandalism.

These territorial reinforcement design principles have been recommended to the operator of the North Tower, and are subject to ongoing coordination and detailing, including through operational procedures.

4 Crime Profile

4.1 Overview

The Metro Martin Place *Integrated Station Development (ISD)* Precinct is located in the City of Sydney LGA. It should be noted that the crime figures included in this section of the report were those crimes recorded by NSW Police. These figures do not necessarily represent all crimes committed in the LGA, as not all crimes are reported to the police.

The offences listed below make up the most prevalent crimes that are relevant to the Precinct. Their five-year trend is also included in order to identify if the security risks that they pose is likely to increase or decrease in the future. It is these offences that CPTED and other security measures employed within the Precinct are most likely to have to protect against.

While a snapshot of the crime profile has been included in this report to provide contextual understanding for the CPTED analysis and treatment measures identified, a more detailed assessment of the Metro Martin Place Precinct crime profile has been conducted in the Security Risk Management Report.

4.2 NSW Crime Profile

According to BOCSAR, in the 24 months to June 2016, two of the 17 major offences showed a significant upward trend across NSW, nine were trending downward and the remaining six offences were stable. The offences trending upward were stealing from retail stores (up 6.3%) and fraud (up 1.7%). Refer to Table 3.

The nine offences which showed a downward trend over the last 24 months were:

- Murder (down 32.1%)
- Robbery without a weapon (down 25.9%)
- Robbery with a firearm (down 41.7%)
- Robbery with a weapon not a firearm (down 22.2%)
- Break and enter dwelling (down 7.2%)
- Motor vehicle theft (down 12.6%)
- Steal from dwelling (down 6.6%)
- Steal from person (down 9.9%)
- Malicious damage to property (down 3.2%)

Due to these trends, 12 major categories of crime in NSW are now at their lowest level in 20 years.

The 12 categories of crime at their lowest in 20 years are:

- Murder

- Robbery without a weapon
- Robbery with a firearm
- Robbery with a weapon not a firearm
- Break and enter dwelling
- Break and enter non-dwelling
- Motor vehicle theft
- Steal from motor vehicle
- Steal from retail store
- Steal from dwelling
- Steal from person
- Malicious damage to property

Shootings are also at the lowest level in 20 years.

4.3 Local Crime Profile

The following is a list of the most prevalent crimes to occur in the LGA that are relevant to Metro Martin Place Precinct, based on total number of offences. A ranking of how the City of Sydney LGA crime rates compare to the other 141 LGAs cannot be provided because its residential population does not accurately reflect the number of people present in the area each day.

Table 2: Most prevalent crimes in the Sydney LGA relevant to the Metro Martin Place Precinct (BOCSAR)

Offence Category	Number
Transport regulatory offences	8755
Assault - non-domestic violence related	3121
Malicious damage to property	2691
Steal from retail store	2185
Steal from motor vehicle	1686
Steal from person	1661
Offensive conduct	1126
Harassment, threatening behaviour and private nuisance	939
Trespass	502
Break and enter non-dwelling	450

The terrorism based security risks relevant to Metro Martin Place Precinct include the following:

- Person Borne Improvised Explosive Device (PBIED) / Placed IED;
- Vehicle Borne Improvised Explosive Device (VBIED);
- Hostile Vehicle Attack;

- Active shooter;
- Melee attack (including knife);
- Hostage / Siege scenario; and
- Chemical / Biological / Radiological Attack (CBR).

4.4 Five Year Trend

As can be seen in the five-year crime trend in Table 3, eight of the ten most prevalent offences applicable to Metro Martin Place Precinct have reduced in occurrence over the previous five-year period.

Based on these trends, the likelihood of these seven offences occurring in the future should generally either remain the same, as currently assessed, or reduce.

Table 3: Five-year crime trend for the City of Sydney LGA (BOCSAR)

Trend information	2011	2012	2013	2014	2015	24mnth Trend	60mnth Trend
Steal from person	2881	2736	2225	1887	1661	-11.98	-42.35
Harassment, threatening behaviour and private nuisance	973	1023	1025	950	939	-1.16	-3.49
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Break and enter non-dwelling	807	819	934	590	450	-23.73	-44.24

General statistical information outlined in Table 3 was sourced from BOCSAR and relate to crime incidents that have occurred in the City of Sydney LGA. These statistics are not detailed to suburb or street level and therefore may not provide a complete representation of historic incidents around the North Tower site.

5 CPTED Analysis

5.1 Overview

An analysis of some key factors that can impact on the CPTED characteristics of the Metro Martin Place Precinct are detailed below.

5.2 Lighting Impacts

Improved lighting may cause a reduction in crime. Improved lighting leads to increased surveillance of potential offenders (both by improving visibility and by increasing the number of people on the street) and hence to increased deterrence of potential offenders. Improved lighting also signals community investment to improve an area, leading to increased community pride, community cohesiveness, and informal social control.

Adequate lighting has been designed for throughout the Metro Martin Place Precinct. Attention will be paid to the interfaces between the station and the public domain to reduce crime opportunity at night.

A meta-analysis of the link between lighting and crime has shown that improved lighting led to a significant (21%) decrease in crime in experimental areas compared with comparable control areas. Furthermore, other studies have found that the financial savings from reduced crimes greatly exceeded the financial costs of the improved street lighting.

5.3 Mixed Use Activation

Mixed use activation of a space is an effective CPTED strategy that enhances the opportunity for natural surveillance and encourages territorial reinforcement. A mixed-use area increases the diversity of individuals using the space, encouraging a safer and more welcoming environment. Inversely, a single use area, such as a business park, tends to have high use during business hours on week days, but remains largely vacant on the weekends and outside of business hours. These low use times increase security risk, as criminals are less likely to be seen committing offences. By encouraging mixed use, opportunity for crime can be reduced due to the natural increase in surveillance by every-day users.

The North Tower has adequately addressed the intention of mixed use activation by utilising the North Tower as a direct thoroughfare to the station, which inherently allows the site to be regularly pedestrianized. Security measures such as access control have been provisioned for, to restrict access after operational hours, hence lowering the security risk.

5.4 Territoriality

Territoriality should be encouraged in users of the space and reinforced by the owner/operator as much as possible. By maintaining the North Tower throughout its operational life, providing a clean and accessible space, and encouraging mixed

use, opportunity for crime can be reduced. Vandalism crimes such as graffiti, scratching, or etching should be cleaned or removed as quickly as possible to encourage legitimate users to continue to care for the space.

6 Design Assessment

This section will discuss observations about the proposed detailed design of the North Tower from a natural surveillance, territoriality and natural access control perspective. The CPTED assessment has been conducted for both towers, but this report *solely* focuses on the North Tower.

6.1 North Tower

6.1.1 Natural Surveillance

The North Tower provides substantial mixed use immediately adjacent to the main entry, with several retail stores providing natural surveillance oversight for users entering and exiting the space. There are good sightlines from the street corners around the two entry points along Hunter Street, reducing the opportunity for opportunistic crime from loiterers.

The retail stores will attract users to the space, who will increase the amount of activity in the area during shopping hours, bringing more ‘eyes on the street’ to report and monitor potential crime during their normal activities. *Furthermore, the retail tenancies in the North Tower are secure to both Elizabeth and Castlereagh Streets via shopfront glazing systems, during non-operation hours (10pm-6am), increasing the visual connection between Martin Place and the street retail spaces and publicly accessible areas throughout all hours of the day and night.*

Glazed shopfronts to retail spaces are maximised in the North Tower to ensure a visually permeable ground plane, allowing for clear sightlines between Metro entrances and other publicly accessible areas, such as Martin Place and surrounding pedestrian footpaths are maintained.

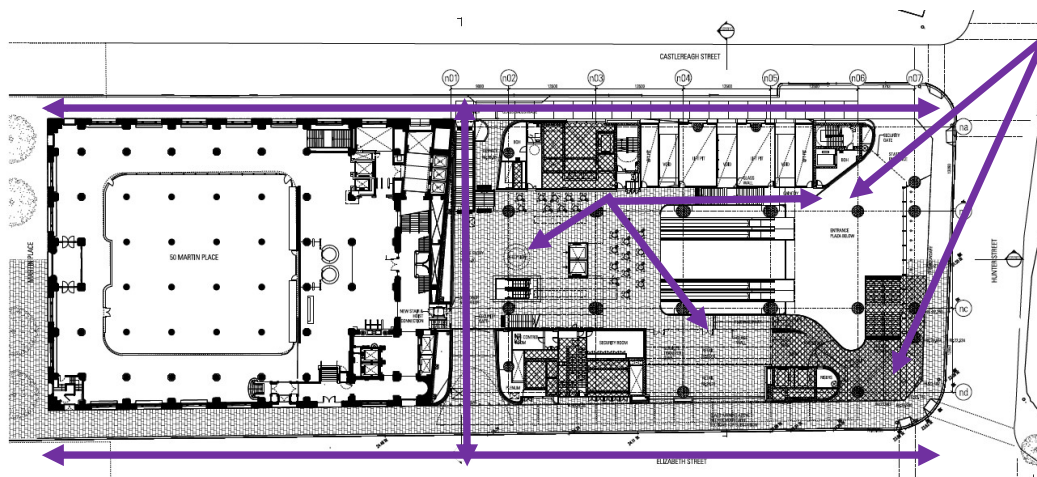


Figure 2: North Tower natural surveillance (note: not all natural surveillance is shown due to the limitations of the drawing)

The Through-Site Link in the North Tower provides a passage from Castlereagh Street to Elizabeth Street. This Through-Site Link will be open to the public during the nominated hours of operation (6am-10pm). Furthermore, the security gate

design located at the Metro entrances in the North Tower are an open grille design, and will be open to the public during Metro hours of operation (6am-2am). The OSD End of Trip Facility (EOFT) entrance via Castlereagh Street is of a metal clad door design, but will be open during the nominated hours of operation (6am-10pm).

Natural surveillance is apparent at the Through-Site Link location due to its level of visibility from the adjacent publicly accessible areas, with the nominated security gates at either end of the Through-Site Link entrances acting as access control barriers.

Overall, the location of the North Tower is ideal from a natural surveillance perspective, with abundant street activity throughout the day including buses, private vehicles, taxi ranks and several surrounding office buildings.

6.1.2 Natural Access Control

The North Tower is slightly less controlled than the South Tower, as the mixed-use interior will attract individuals who are not the intended users. *Whilst increased pedestrian thoroughfare traffic can increase the likelihood of crime, the increase in diversity and number of users encourage the sense of safety and natural surveillance.*

Public Domain finishes are extended into Metro spaces of the precinct, to encourage permeability and accessibility. These finishes are distinct from retail and OSD finishes, and assist in determining the differentiation between public and private/semi-private spaces.

6.1.3 Active Access Control/ Security Barriers

A Security Risk Assessment was undertaken for the Metro Martin Place precinct, which identified risks to the North Tower, South Tower, and Station. As a result, physical barriers were recommended for use to secure the North Tower during non-operational hours (10pm-6am). Physically being able to lock off and shut down the tower/metro during non-operational hours was a recommended mitigation measure for the identified risks. These barriers will be operated in accordance with the nominated hours of operation (6am-10pm), and will not impede the intended use of the Through-Site Link. An example of these secure entry locations is shown in Figure 3 with secure lines marked in red.

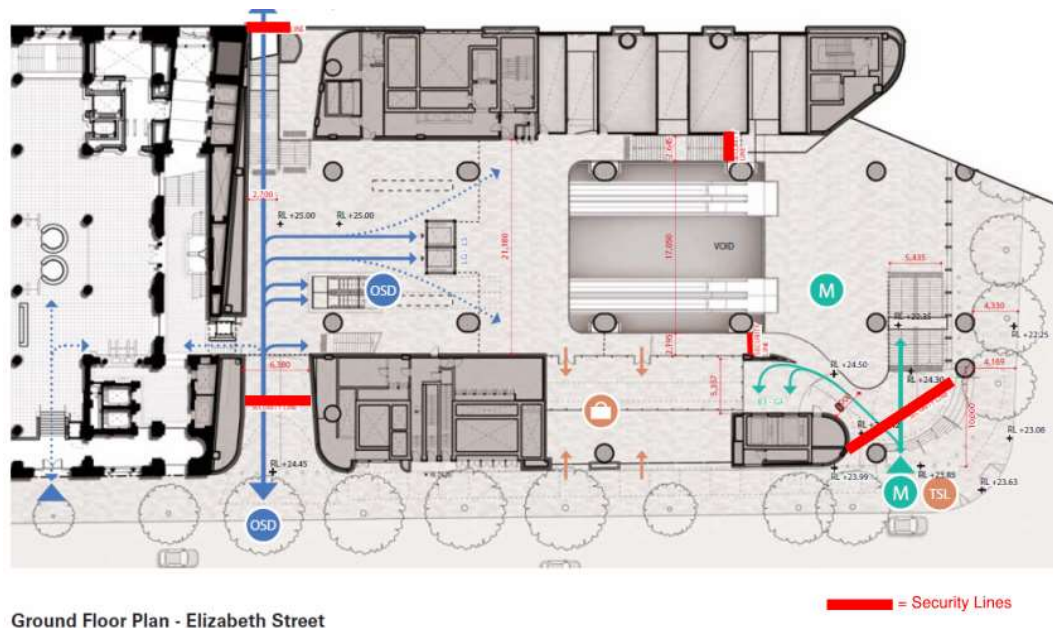


Figure 3: Secure Entry Locations

During hours of operation, the North Tower ground plane is assumed open to public, the Level 01 office lift lobby is secure via turnstiles and is open during - normal hours of operation (6am-10pm) After hour access is assumed to be electronically access controlled.

6.1.4 Territoriality

The Metro Martin Place Precinct has been designed so that users are naturally funnelled towards their intended destinations. This should be strongly reinforced with appropriate signage and wayfinding tools. Wayfinding signage reduces terrain-vagueness, encourages users to feel safe and in control, which in turn reduces the opportunity for crime to occur. *Specific signage and awnings define the North Tower OSD entrances and provide differentiation from Metro entrances.*

The City of Sydney's street furniture suite will be adopted for the Station's Primary and Secondary Plazas, which encompasses Martin Place and the surrounding footpaths on Castlereagh Street, Elizabeth Street, and Hunter Street. A colour, materials and finishes palette sensitive to the existing urban character extends through public links to the Station to aid wayfinding, accentuate movement, and reinforce the public character of the Station precinct, as shown in Figure 4.



Figure 4: Reinforcing a psychological sense of territoriality through the colour scheme

Loitering and littering should be treated where possible as these activities reduce user ownership of the space and comfort.

Lighting throughout the North Tower is very important in providing a safe and secure space, particularly at night. Adequate lighting *is to be* provided at all entry and exit points of the North Tower.

7 Recommendations

In consideration of the design assessment, the CPTED recommendations have been implemented in to the design. These recommendations include the implementation of several natural surveillance, natural access control, and territoriality measures to improve the CPTED characteristics throughout the North Tower.

These recommendations are:

- Provide clear definition and designation of space in a manner that encourages and predicts authorised movement and does not cause conflict between the intended purpose of the space and the desired behaviour.
- Maximise circulation areas by minimising built structures and avoiding clutter, particularly along pedestrian routes.
- Design the layout of building entrances and foyers to assist natural surveillance by reducing clutter and blind spots and by positioning reception/concierge where they have clear sightlines of entrances, the general foyer areas and waiting areas.
- Use of glass partitions wherever possible to improve sight lines and the transmission of natural light, and be fitted with anti-graffiti coatings (where practical) where these partitions are accessible to the public.
- Durable public furniture and amenity construction to limit damage and subsequent repairs over the life of the facility.
- Keep the surrounds as tidy and well-presented as possible to enhance the territoriality aspects of the site.
- The mixed-use areas will help ensure regular and diverse use of the facility which also enhances the territoriality aspects of the site, whilst enhancing the opportunity for natural surveillance. Encouraging regular and diverse use of the South Site through these and other measures are recommended.
- Ensure adequate lighting is provided throughout the precinct.
- Ensure public realm lighting is appropriate for use at night.
- Provide signage throughout the ISD to remove excuses for loitering and littering, each being a significant detractor to territoriality.
- Ensure signage is appropriate for improving wayfinding and reducing terrain vagueness within the ISD.

CPTED is only one part of a holistic security strategy, and the implementation of physical, electronic, and operational security controls will be required to provide effective security protection to the site.