

# **SERVICES AND UTILITIES INFRASTRUCTURE REPORT**

APPENDIX AA





# Sydney Metro City & Southwest

## Pitt Street North over station development:

### Services and Utilities Infrastructure Report

<b>Applicable to:</b>	OSD Pitt Street North
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<b>Owner</b>	Sydney Metro
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## 1.0 Purpose of this report

### 1.1. Background

This report supports a concept State Significant Development Application (concept SSD Application) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The concept SSD Application is made under section 4.22 of the EP&A Act.

Sydney Metro is seeking to secure concept approval for a mixed use tower above the northern portal of Pitt Street Station, otherwise known as the over station development (OSD). The concept SSD Application seeks consent for a building envelope and its use for residential accommodation, visitor accommodation and commercial premises, maximum gross floor area (GFA), pedestrian and vehicular access, circulation arrangements and associated car parking as well as the strategies and design parameters for the future detailed design of development.

Sydney Metro proposes to construct the OSD as part of an integrated station development package, which would result in the combined delivery of the station, OSD and public domain improvements. The station and public domain elements form part of a separate planning approval for Critical State Significant Infrastructure (CSSI) approved by the Minister for Planning on 9 January 2017.

As the development is within a rail corridor, is associated with railway infrastructure and is for the purposes of residential or commercial premises with a Capital Investment Value of more than \$30 million, the project is State Significant Development (SSD) pursuant to Schedule 1, clause 19(2)(a) of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). The full extent of the proposed development is also State Significant Development by virtue of clause 8(2) of the SRD SEPP.

This report has been prepared to respond to the Secretary's Environmental Assessment Requirements (SEARs) issued for the concept SSD Application for Pitt Street North on 30<sup>th</sup> November 2017 which state that the Environmental Impact Statement (EIS) is to address the following requirement:

*Service and utilities infrastructure report*

### 1.2. Overview of the Sydney Metro in its context

The New South Wales (NSW) Government is implementing *Sydney's Rail Future*, 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 (Transport for NSW, 2012). Sydney Metro is a new standalone rail network identified in *Sydney's Rail Future*.

Sydney Metro is Australia's biggest public transport project, consisting of Sydney Metro Northwest, which is scheduled for completion in 2019 and Sydney Metro City & Southwest, which is scheduled for completion in 2024.

Sydney Metro West is expected to be operational in the late 2020s. (Refer to **Figure 1**).



Figure 1: Sydney Metro alignment map

Sydney Metro City & Southwest includes the construction and operation of a new metro rail line from Chatswood, under Sydney Harbour through Sydney’s CBD to Sydenham and on to Bankstown through the conversion of the existing line to metro standards.

The project also involves the delivery of seven new metro stations, including at Pitt Street. Once completed, Sydney Metro will have the ultimate capacity for 30 trains an hour (one every two minutes) through the CBD in each direction - a level of service never seen before in Sydney.

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham application as a Critical State Significant Infrastructure project (reference SSI 15\_7400), hereafter referred to as the CSSI Approval.

The CSSI Approval includes all physical work required to construct the CSSI, including the demolition of existing buildings and structures on each site. Importantly, the CSSI Approval also includes provision for the construction of below and above-ground structures and other components of the future ISD (including building infrastructure and space for future lift cores, plant rooms, access, parking and building services, as relevant to each site). The rationale for this delivery approach, as identified within the CSSI Application, is to enable the ISD to be more efficiently built and appropriately integrated into the metro station structure.

The EIS for the Chatswood to Sydenham component of the Sydney Metro City & Southwest project identified that the OSD would be subject to a separate assessment process.

Since the CSSI Approval was issued, Sydney Metro has lodged four modification applications to amend the CSSI Approval as outlined below:

- Modification 1- Victoria Cross and Artarmon Substation which involves relocation of the Victoria Cross northern services building from 194-196A Miller Street to 50 McLaren Street together with inclusion of a new station entrance at this location referred to as Victoria Cross North. 52 McLaren Street would also be used to support construction of these works. The modification also involves the relocation of the substation at Artarmon from Butchers Lane to 98 – 104 Reserve Road. This modification application was approved on 18 October 2017.
- Modification 2- Central Walk which involves additional works at Central Railway Station including construction of a new eastern concourse, a new eastern entry, and upgrades to suburban platforms. This modification application was approved on 21 December 2017.
- Modification 3 - Martin Place Station which involves changes to the Sydney Metro Martin Place Station to align with the Unsolicited Proposal by Macquarie Group Limited (Macquarie) for the development of the station precinct. The proposed modification involves a larger reconfigured station layout, provision of a new unpaid concourse link and retention of the existing MLC pedestrian link and works to connect into the Sydney Metro Martin Place Station. It is noted that if the Macquarie proposal does not proceed, the modification (if approved) would be surrendered. This modification application was approved on 22 March 2018.
- Modification 4 - Sydenham Station and Sydney Metro Trains Facility South which incorporated Sydenham Station and precinct works, the Sydney Metro Trains Facility South, works to Sydney Water's Sydenham Pit and Drainage Pumping Station and ancillary infrastructure and track and signalling works into the approved project. This modification application was approved on 13 December 2017. Given the modifications, the CSSI Approval is now approved to operate to Sydenham Station and also includes the upgrade of Sydenham Station.

The remainder of the City & Southwest project (Sydenham to Bankstown) proposes the conversion of the existing heavy rail line and the upgrade of the existing railway stations along this alignment to metro standards. This portion of the project, referred to as the Sydenham to Bankstown Upgrade, is the subject of a separate CSSI Application (No. SSI 17\_8256) for which an Environmental Impact Statement was exhibited between September and November 2017 and a Response to Submissions and Preferred Infrastructure Report was submitted to the NSW Department of Planning & Environment (DPE) in June 2018 for further exhibition and assessment.



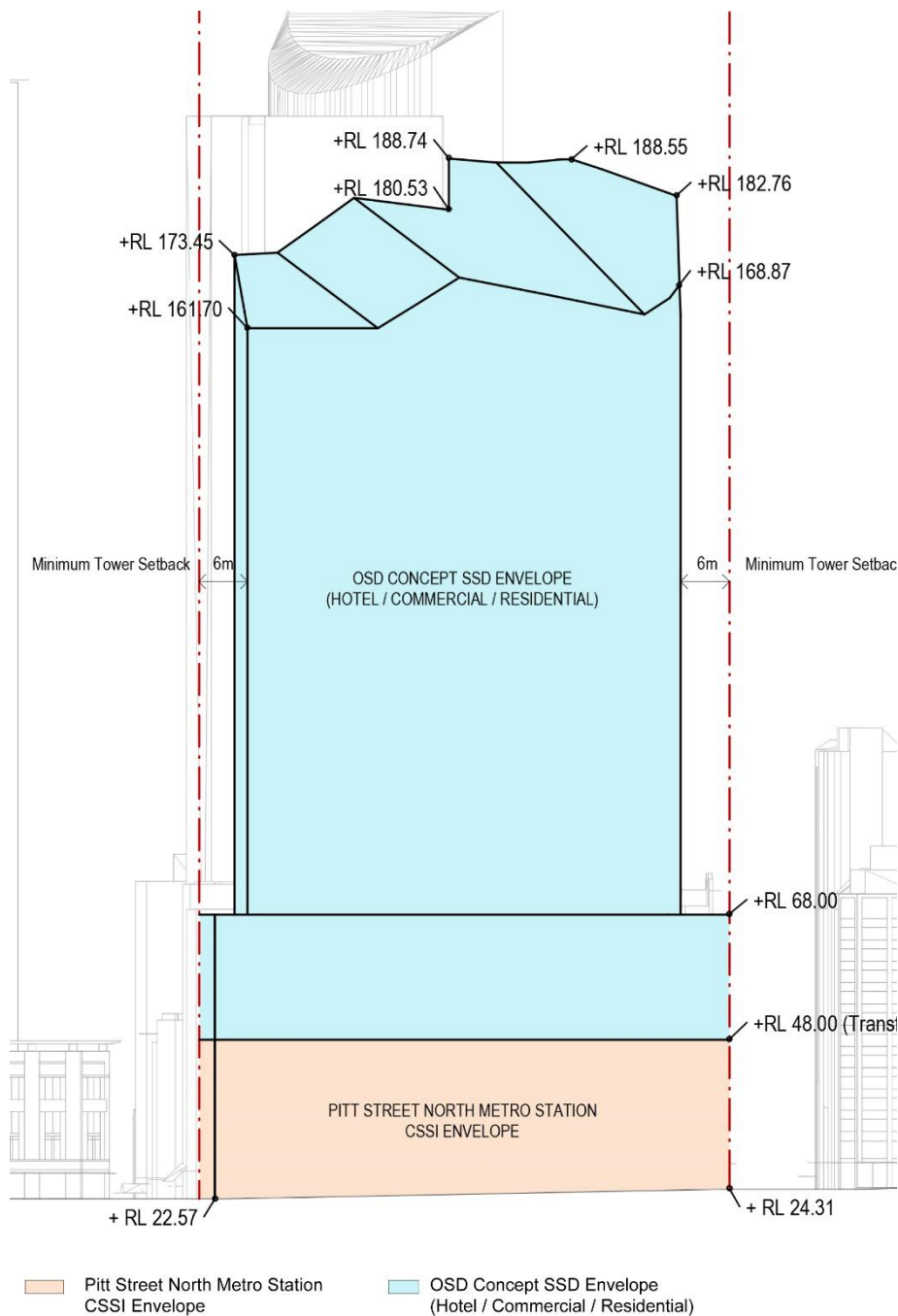
### 1.3. Planning relationship between Pitt Street Station and the OSD

While the northern portal of Pitt Street Station and the OSD will form an integrated station development, the planning pathways defined under the *Environmental Planning and Assessment Act 1979* require separate approval for each component of the development. In this regard, the approved station works (CSSI Approval) are subject to the provisions of Part 5.1 of the EP&A Act (now referred to as Division 5.2) and the OSD component is subject to the provisions of Part 4 of the EP&A Act.

For clarity, the approved station works under the CSSI Approval included the construction of below and above ground structures necessary for delivering the station and also enabling construction of the integrated OSD. This included but is not limited to:

- demolition of existing development
- excavation
- station structure including concourse and platforms
- lobbies
- retail spaces within the station building
- public domain improvements
- station portal link (between the northern and southern portals of Pitt Street Station)
- access arrangements including vertical transport such as escalators and lifts
- structural and service elements and the relevant space provisioning necessary for constructing OSD, such as columns and beams, space for lift cores, plant rooms, access, parking, retail and building services.

The vertical extent of the approved station works above ground level is defined by the 'transfer slab' level (which for Pitt Street North is defined by RL 48.00), above which would sit the OSD. This delineation is illustrated in **Figure 2** below.



**Figure 2:** Delineation between station and OSD

The CSSI Approval also establishes the general concept for the ground plane of Pitt Street Station including access strategies for commuters, pedestrians and workers. In this regard, pedestrian access to the station would be from Park Street and the OSD lobbies would be accessed from Pitt Street, Park Street and Castlereagh Street.

Since the issue of the CSSI Approval, Sydney Metro has undertaken sufficient design work to determine the space planning and general layout for the station and identification of those

spaces within the station area that would be available for the OSD. In addition, design work has been undertaken to determine the technical requirements for the structural integration of the OSD with the station. This level of design work has informed the concept proposal for the OSD. It is noted that ongoing design development of the works to be delivered under the CSSI Approval would continue with a view to developing an Interchange Access Plan (IAP) and Station Design Precinct Plan (SDPP) for Pitt Street Station to satisfy Conditions E92 and E101 of the CSSI Approval.

The public domain improvement works around the site would be delivered as part of the CSSI Approval.

### 1.4. The Site

The Pitt Street North OSD site is located at the southern portion of the Sydney CBD block bounded by Pitt Street, Park Street and Castlereagh Street, above the northern portal of the future Pitt Street Station (refer to Error! Reference source not found. below).

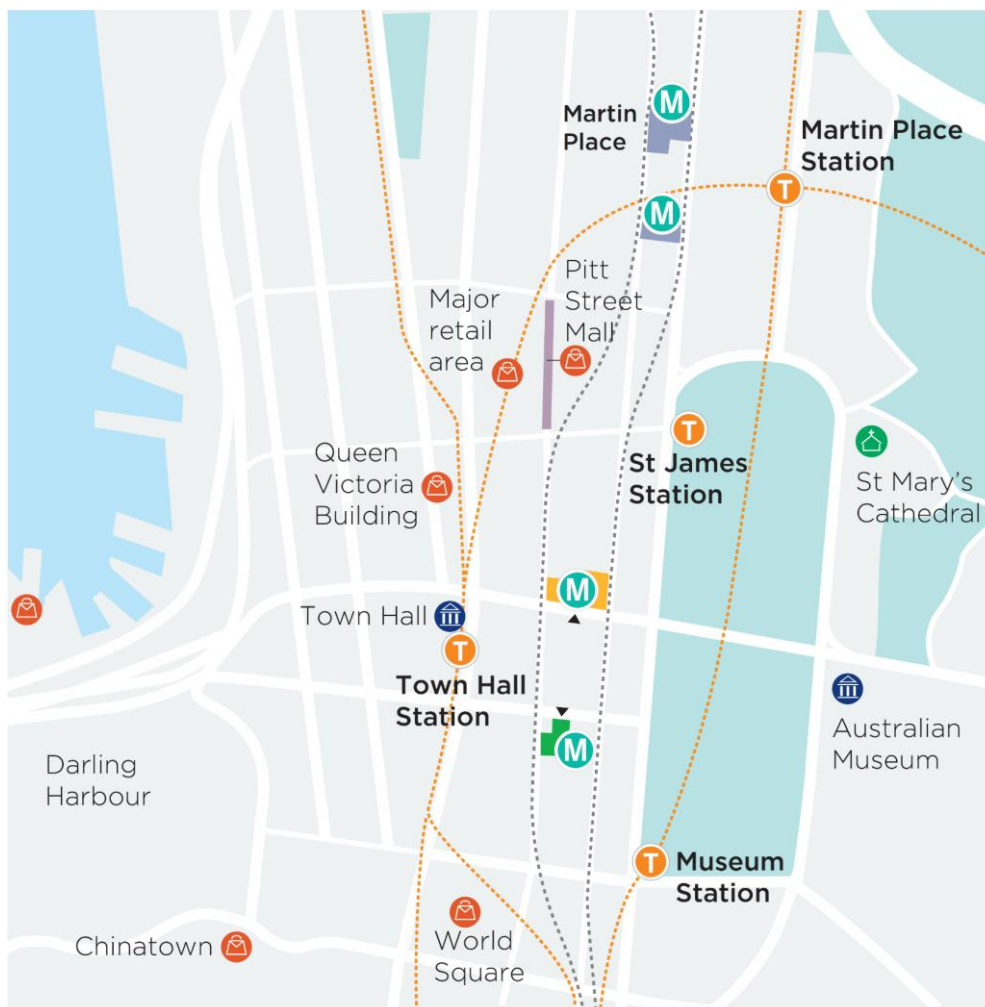
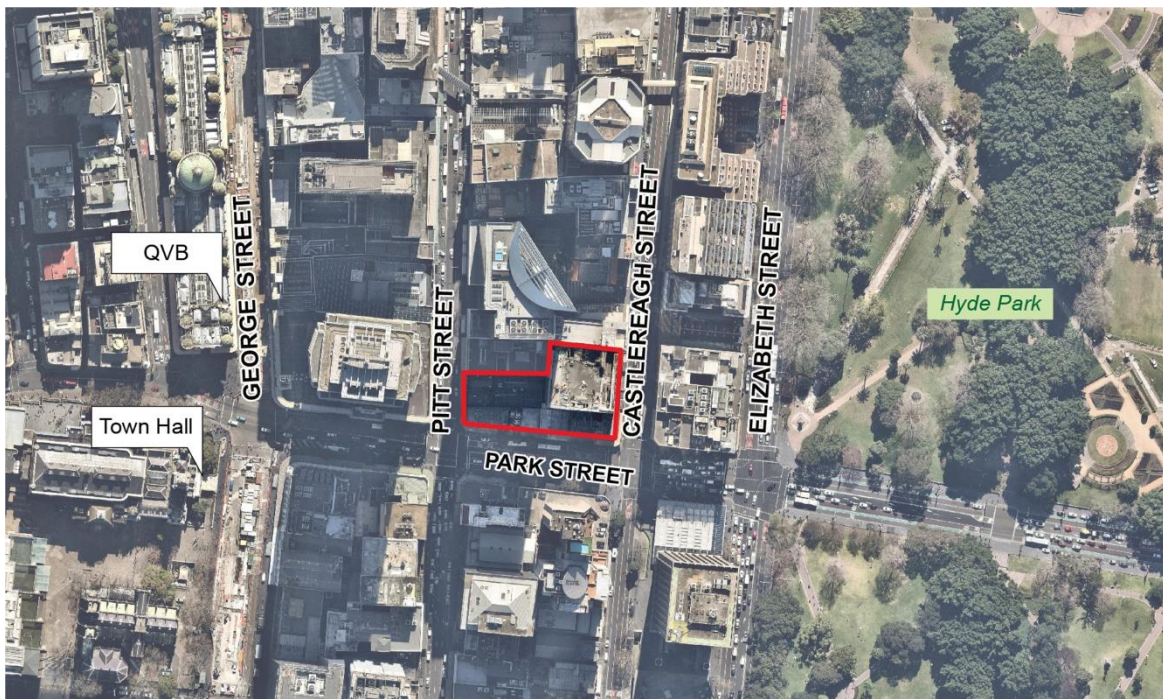


Figure 3: Pitt Street Station location plan

The site is located in the City of Sydney Local Government Area. The site (refer to **Figure 4** below) is irregular in shape, has a total area of approximately 3,150 square metres and has street frontages of approximately 28 metres to Pitt Street, 81 metres to Park Street and 48 metres to Castlereagh Street.

The site address is 175-183 Castlereagh Street, Sydney and comprises the following properties:

- Lot 3 in DP 74952
- Lot 1 in DP 229365
- Lot 2 in DP 900055
- Lot 1 in DP 596474
- Lot 17 in DP 1095869
- Lot 2 in DP 509677
- Lot 1 in DP 982663
- Lot 2 in DP 982663
- Lot 3 in DP 61187
- Lot 1 in DP 74367



 The Site

 NOT TO SCALE

**Figure 4:** Aerial photo of Pitt Street North



## 1.5. Overview of the proposed development

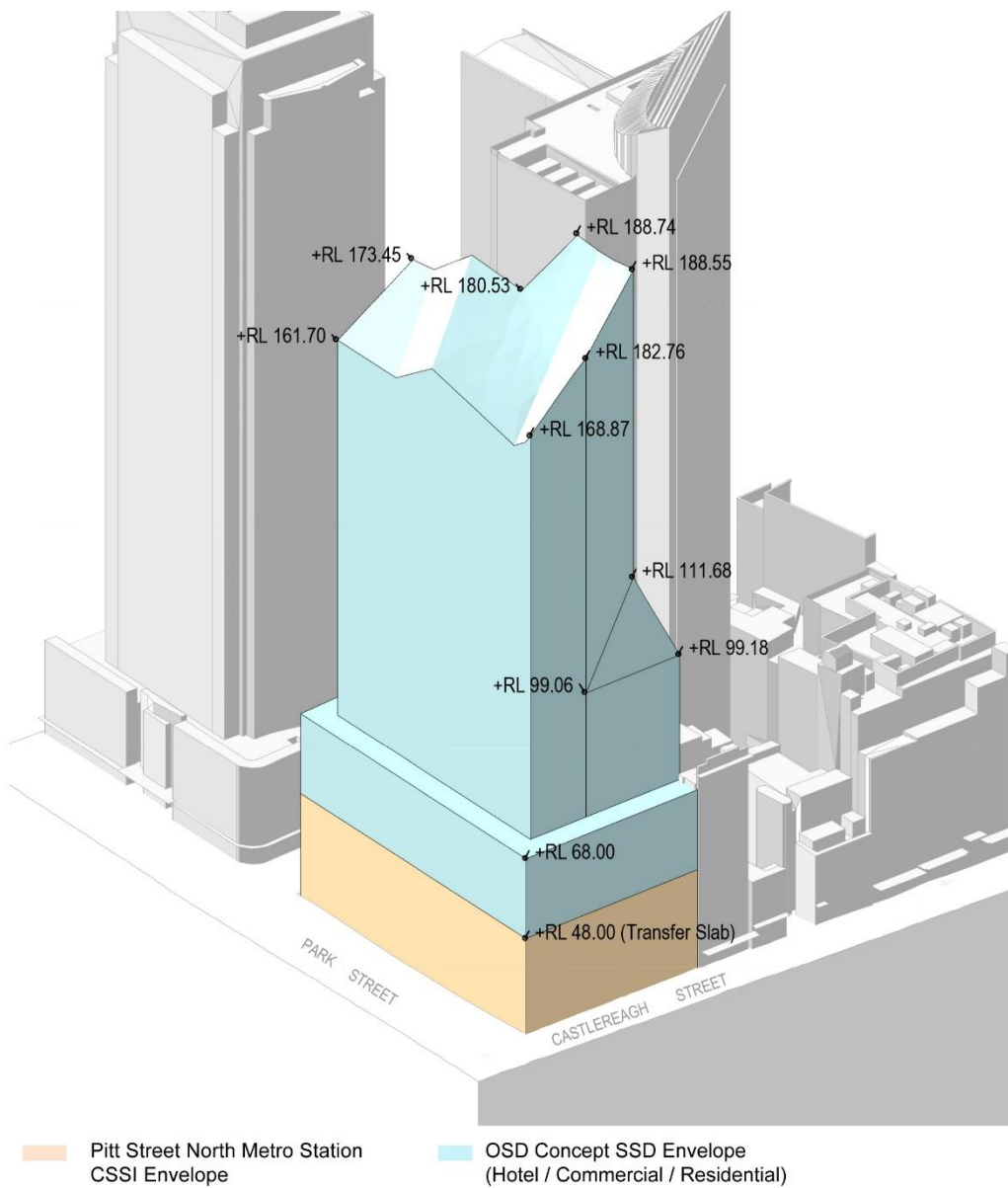
The concept SSD Application seeks concept approval in accordance with section 4.22 of the EP&A Act for the OSD above the approved Pitt Street Station (northern portal). This Application establishes the planning framework and strategies to inform the detailed design of the future OSD and specifically seeks planning approval for:

- a building envelope as illustrated at **Figure 5**
- a maximum building height of approximately Relative Level (RL) 189 which equates to approximately 43 storeys including a podium height of RL68 (approximately 45m), which equates to approximately 12 storeys above ground
- a maximum GFA of 49,120 square metres for the OSD component, which equates to a Floor Space Ratio (FSR) of 15.59:1, resulting in a total maximum GFA at the site (including station floorspace) of 50,309 square metres and a total maximum FSR of 15.97:1, including flexibility to enable a change in the composition of land uses within the maximum FSR sought
- conceptual use of the building envelope for a range of uses including commercial office space, visitor accommodation and residential accommodation
- use of the conceptual OSD space provisioning within the footprint of the CSSI Approval (both above and below ground), including the OSD lobby areas, podium car parking, storage facilities, services and back-of-house facilities
- car parking for approximately 50 spaces located across five levels of the podium
- loading and vehicular access arrangements from Pitt Street
- pedestrian access from Pitt Street, Park Street and Castlereagh Street
- strategies for utilities and service provision
- strategies for the management of stormwater and drainage
- a strategy for the achievement of ecologically sustainable development
- indicative signage zones
- a strategy for public art
- a design excellence framework
- the future subdivision of parts of the OSD footprint (if required)

As this concept SSD Application is a staged development pursuant to section 4.22 of the EP&A Act, future approval would be sought for detailed design and construction of the OSD. A concept indicative design, showing a potential building form outcome at the site, has been provided as part of this concept SSD Application at Appendix E.

Pitt Street Station is to be a key station on the future Sydney Metro network, providing access to the Sydney Central Business District (CBD). The proposal combines the metro station with a significant mixed use tower, contributing to the Sydney skyline. The OSD would assist in strengthening the role of Central Sydney as the key centre of business in Australia and would contribute to the diversity, amenity and sustainability of the CBD.

It is noted that Pitt Street Station southern portal OSD has been subject to a separate application, and does not form part of this concept SSD Application.



**Figure 5:** Pitt Street North OSD building, including OSD components (orange) and station box (grey)



**Figure 6:** Pitt Street North OSD indicative design, as seen from eastern, southern and western elevations

## 1.6. Staging and framework for managing environmental impacts

Sydney Metro proposes to procure the delivery of the Pitt Street North integrated station development in one single package, which would entail the following works:

- station structure
- station fit-out, including mechanical and electrical
- OSD structure
- OSD fit-out, including mechanical and electrical.

Separate delivery packages are also proposed by Sydney Metro to deliver the excavation of the station boxes/shafts ahead of the ISD delivery package, and line-wide systems (e.g. track, power, ventilation) and operational readiness works prior to the Sydney Metro City & Southwest metro system being able to operate.

Three possible staging scenarios have been identified for delivery of the integrated station development:

1. Scenario 1 – the station and OSD are constructed concurrently by constructing the transfer slab first and then building in both directions. Both the station and OSD would be completed in 2024.

2. Scenario 2 – the station is constructed first and ready for operation in 2024. OSD construction may still be incomplete or soon ready to commence after station construction is completed. This means that some or all OSD construction is likely to still be underway upon opening of the station in 2024.
3. Scenario 3 – the station is constructed first and ready for operation in 2024. The OSD is built at a later stage, with timing yet to be determined. This creates two distinct construction periods for the station and OSD.

Scenario 1 represents Sydney Metro's preferred option as it would provide for completion of the full integrated station development and therefore the optimum public benefit at the site at the earliest date possible (i.e. on or near 2024 when the station is operational). However, given the delivery of the OSD could be influenced by property market forces, Scenarios 2 or 3 could also occur, where there is a lag between completion of the station component of the ISD (station open and operational), and a subsequent development.

The final staging for the delivery of the OSD would be resolved as part of the detailed SSD Application(s).

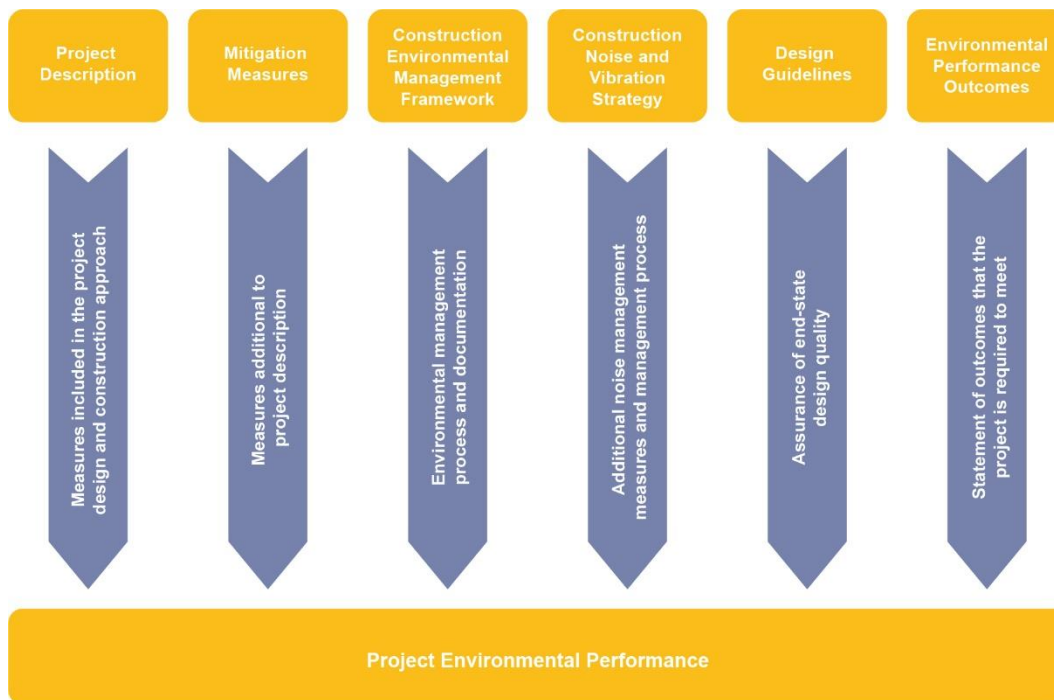
For the purposes of providing a high level assessment of the potential environmental impacts associated with construction, the following have been considered:

- Impacts directly associated with the OSD, the subject of this SSD Application
- Cumulative impacts of the construction of the OSD at the same time as the station works (subject of the CSSI Approval).

Given the integration of the delivery of the Sydney Metro City & Southwest metro station with an OSD development, Sydney Metro proposes the framework detailed in **Figure 7** to manage the design and environmental impacts, consistent with the framework adopted for the CSSI Approval, which includes:

- project design – measures which are inherent in the design of the project to avoid and minimise impacts
- mitigation measures – additional to the project design which are identified through the environmental impact assessment
- construction environmental management framework – details the management processes and documentation for the project
- construction noise and vibration strategy – identifies measures to manage construction noise and vibration
- design guidelines – provides an assurance of end-state quality
- environmental performance outcomes – establishes intended outcomes which would be achieved by the project





**Figure 7:** Project approach to environmental mitigation and management

Sydney Metro proposes to implement a similar environmental management framework where the integrated delivery of the CSSI station works and the OSD occur concurrently. This would ensure a consistent approach to management of design interface and construction-related issues.

Sydney Metro proposes this environmental management framework would apply to the OSD until completion of the station and public domain components of the integrated station development delivery contract (i.e. those works under the CSSI Approval). Should the OSD be constructed beyond the practical completion and opening of the section, standard practices for managing construction related environmental impacts would apply in accordance with the relevant guidelines and Conditions of Approval for the detailed SSD Application(s).

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## 2.0 Introduction

This report presents the building services options proposed for the OSD Pitt Street North development on the corner of Pitt Street, Park Street, and Castlereagh St for the purposes of supporting the Concept SSD Application to the Sydney City Council. It is noted that the utilities that serve the OSD will be completely separate from those serving the Metro station.

This report provides a list of proposed and potential strategies that will be considered for incorporation into the development.

The following services are described in this report:

- Building Utilities – Site Services
- Mechanical
- Electrical
  - Communications
  - Security
- Hydraulics
- Fire protection

The building services serve a number of different building classifications as follows:

- Residential Apartments - Class 2
- Hotel – Class 3
- Commercial Office – Class 5
- Carpark – Class 7a

For each of these building classifications, the building services have been designed to meet the specific requirements of the NCC/Building Code of Australia, and relevant Codes and Standards.

### 3.0 Reference Design Documentation

This report has been prepared for the OSD Pitt Street North development project based on the architectural design revision A, DA submission December 2017 by Architectus Architects.

Sydney Metro have conducted consultation with the discrete authorities to identify the assets that will be affected by the Sydney Metro project.

- The following utility authorities have been consulted: Sydney Water
- Council - Various
- Roads & Maritime Services
- Jemena
- Ausgrid
- TransGrid
- Telstra
- Optus/Uecomm
- NBN Co
- TPG (AAPT/Powertel/PipeNetworks)
- Verizon/Worldcom
- AARNet
- Vocus (Amcom / M2 / Dodo / iprimus / Engine / Commander /Nextgen/Visionstream)

Sydney Metro has engaged with these Authorities. Suggested particular references for the Pitt St North Development include the following:

Ref	Document
6	Jemena SM Dev. Servicing Proposal
7	Jemena SM Gas connection feasibility estimate
16	Sydney Water Notice of Requirements – Station construction driveways CN168995
18	Ausgrid Project SC12986 - Castlereagh St Sydney
19	SC12986 - Design Information Site Specific
22	170715-SWC Feasibility Letter Pitt St Nth

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## 4.0 Building Utilities – Site Services

### 4.1 General

The following infrastructure will be provided to the development:

- Electricity supply and reticulation
- Telecommunications
- Sewer services
- Water services
- Gas infrastructure

### 4.2 Electricity supply and reticulation

It is noted that there has been consultation that has been conducted between Sydney Metro and Ausgrid with the proposal of works included in Reference 19. The maximum demand used during these discussions has based on the previous design.

The following describes the existing and proposed infrastructure arrangement to the development;

Preliminary maximum demand calculations indicate a supply of 4.0MVA (5700A/phase) is required. The proposed location for the new indoor substation will be on Level 1 at the Eastern edge of the site (subject to Accredited Service Provider Level 3 design and authority approval). The authority will require 24 hours access to the substation. Dual access via Castlereagh Street will be provided. The substation will be provided with an access hatch above the loading dock entry to facilitate the removal of transformers should it be required at any time.

It is proposed that the new incoming electricity supply to the substation will be supplied Underground (U/G) from Castlereagh Street.





Figure 4.1: Existing network (AusGrid) as provided via dial before you Dig

## 4.4 Sewer Services

The new development will likely require a 225ø sewer connection to the authority mains in both Pitt St and Castlereagh St.

Sydney Water Dial before you Dig drawings show a 225ø vitrified clay sewer within Pitt Street and Castlereagh Street, however, it is noted that Sydney Water have advised in the Feasibility Letter CN170715 that the sewer in Pitt St is 300 ø . The size will be verified during detailed design.

The final sewer connection locations and size will be subject to both coordination of the building layout as well as the final design.

Sydney Metro via their Water Services Coordinator (WSC) have undertaken initial consultation with Sydney Water. The developer of the OSD will undertake further consultation as the design progresses and seek approvals based on their final design.



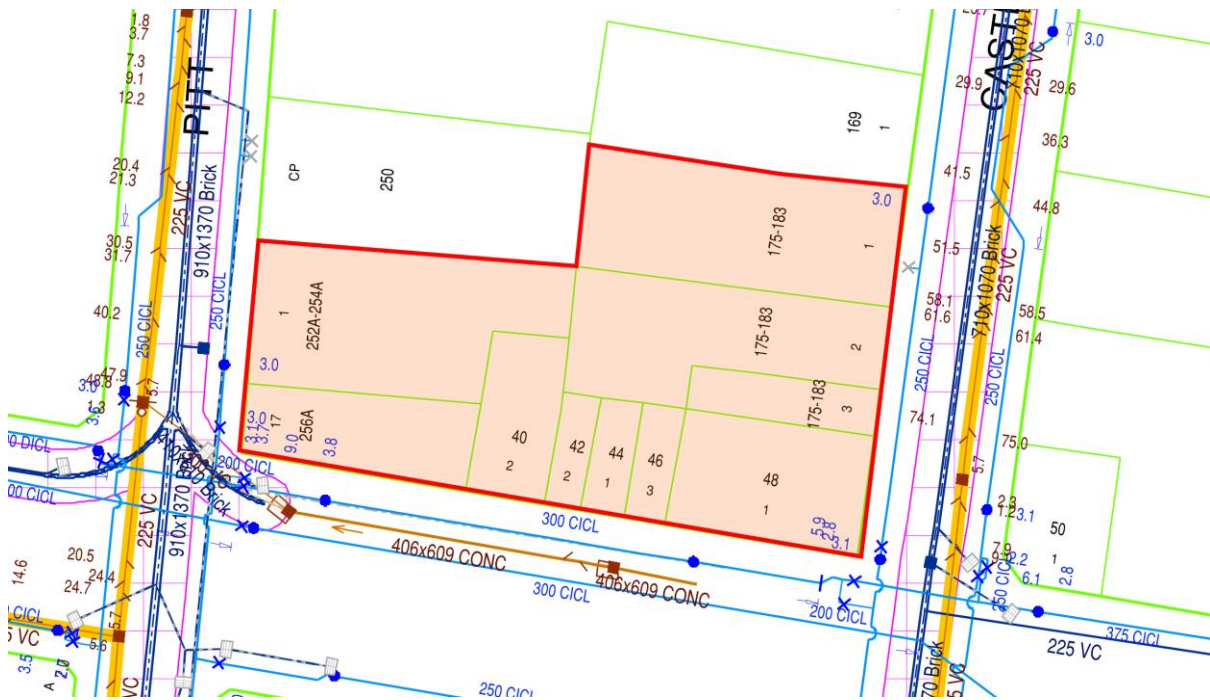


Figure 4.3: Existing Sydney Water network as provided via Dial before you Dig service

## 4.5 Water Services

### Domestic Water Supply

Sydney Waters water service drawing show an existing 250ømm main on Castlereagh St, a 250ømm main on Pitt St and a 300ømm main on Park St.

A new potable and fire services tapping will be required Castlereagh St to service the new development.

The final water tapping location and size will be subject to both coordination of the building layout as well as the final design.

### Combined Fire Water Supply

A fire services water supply will be provided. It will be single a water supply as defined in AS 2118.6-2012. The water supply will serve both the fire sprinkler system and the fire hydrant system and will consist of:

- Direct connection from the town main complete with double check valve set by the Hydraulic trade. The fire trade will connect from the Back Flow Prevention Device and continue the supply and provide all associated equipment for the Fire Brigade booster arrangement.
- Fixed on-site water storage tank divided into two equal sections so that, in the event that one section is isolated and drained for maintenance, the other section will remain in service.

An electric booster pump (primary) and diesel booster pump (secondary) will be provided to boost water supplies to the peak flow rate and pressure requirements of the fire hydrant and sprinkler system. Pumps will be located in a dedicated fire pump room with direct access to a road or open space via the fire stair, as required by AS 2419.1.

### Fire Main Reticulation

Piping to which sprinkler installations and fire hydrants are directly connected to shall be from a 100mm ring main (single pressure zone).

Vertical portions of the ring main pipes shall be located within separate fire isolated stairs.

### Fire Tank

The building will be provided with two fire tanks. These will consist of a 50kL water storage tank within the level 5 plantroom, and a 50kL water storage tank within the Level 40 plantroom.

The fire service tank volume is calculated based on simultaneous flow from fire hydrants, sprinklers and a nominal quantity of internal drenchers (where required).

Construction of the water storage tank shall be off stainless steel.

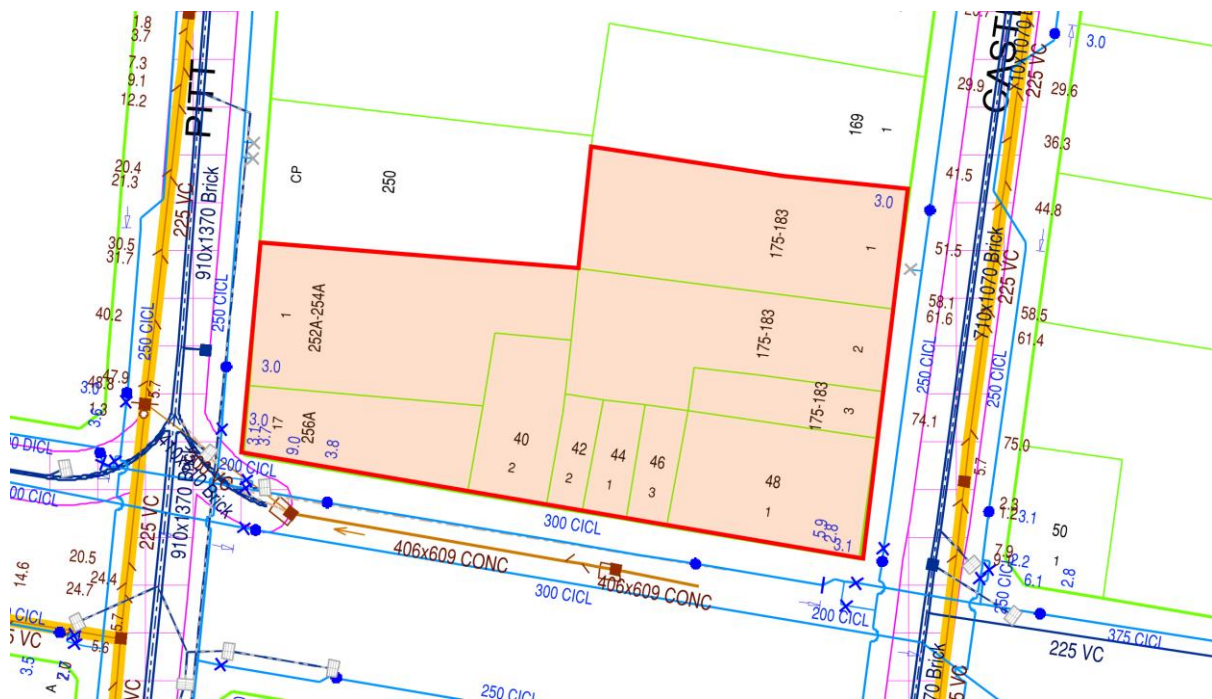


Figure 4.4: Existing Sydney Water network as provided via Dial before you Dig service

### Gas infrastructure

Sydney Metro have undertaken preliminary consultation with Jemena. The developer of the OSD will undertake further consultation as the design progresses and seek approvals based on their final design.





## 5.0 Mechanical Services

### 5.1 General

The main features including within the mechanical services systems for this building are;

- Air Conditioning Systems
- Ventilation and Exhaust
- Smoke Hazard Management
- Associated Piping System
- Associated Control System; Building Management Control System

### 5.2 Design Criteria

The building's mechanical services systems will generally be designed to achieve the following requirements.

#### External Design Conditions

The following ambient design conditions used for the Sydney CBD:

	Summer	Winter
• Class 2 & 3	33.0°C DB, 23.5°C WB	6.0°C DB
• Class 5	31.1°C DB, 22.7°C WB	7.0°C DB

#### Internal Design Conditions

The following values will be applied to the design, with assessment for modification as noted.

	Summer	Winter
• Class 2 Residential Apartments	24.0°C DB	21.0°C DB
• Class 3 Hotel	24.0°C DB	21.0°C DB
• Class 5 Commercial Office	22.5°C DB ± 1.5°C	22.5°C DB ± 1.5°C

No humidity control shall be provided however inherent psychrometric processes should limit the maximum humidity to no more than 65%.

### 5.3 Proposed Air Conditioning Systems

#### Residential Apartment

The proposed residential apartments will be provided with direct expansion (DX) fan coil units located in ceiling bulkheads. Each apartment will have their air conditioning systems sized to cater for the thermal loads serving the main living space and bedrooms.

On apartment levels, corridors will be provided with conditioned outdoor air from central air handling units located in the level 5 and level 42 plantrooms. Outdoor air shall be ducted to each residential apartment via the corridor ceiling.

Heat rejection from the fan coil units will be through refrigeration pipework to a water-cooled heat exchanger located on every floor. Cooling water from the heat exchanger shall be piped to a cooling towers located on the 42<sup>nd</sup> floor roof plantroom and dedicated to the residential apartments.

Heating of condenser water for the use of reverse cycle air conditioning shall be achieved by gas fired hot water heaters injecting heat into the condenser water system on level 41.

### **Hotel**

The proposed hotel rooms will be provided with chilled water and heating water fan coil units mounted in ceiling bulkheads. Each hotel room will have air conditioning systems sized to cater for the thermal loads serving the main room.

The reception area, function room, dining area, meeting rooms, kitchen, and back of house areas will all be served by dedicated chilled water and heating water air handling units.

Outdoor air shall be served to each hotel room from a central fan unit dedicated to the hotel and located in the Level 5 plantroom. On hotel room floors, corridors will be provided with conditioned outdoor air. Outdoor air shall be ducted to each hotel room via the corridor ceiling.

Heat rejection from the hotel chiller will be through condenser water pipework piped to cooling towers located on the roof. Cooling water from the heat exchanger shall be piped to cooling towers located on the roof and dedicated to the hotel.

### **Commercial Office**

The commercial office spaces will be provided with water cooled packaged units located in the mid-rise plantroom. These units will be ducted to the commercial office space on levels 2 and 3. Heat rejection from the water cooled packaged units will be by cooling tower(s) located on the roof plantroom. The commercial office condenser water system will be dedicated to serve the commercial office of the development.

### **Mechanical Ventilation**

Mechanical ventilation will be provided to the following spaces:

- Carpark Supply and Exhaust AS1668.1 & 2
- WC Areas: To AS1668.2(not less than 10 Air Changes)
- Stair Pressurisation To AS1668.1
- Garbage/Grease Arrestor Room To AS1668.2
- Hotel Kitchen Exhaust 10,000 L/s
- Hotel Kitchen Supply Air makeup 10,000 L/s
- Plantroom Spaces To AS1668.2
- Gas Meter Room To Gas Code

## **5.4 Smoke Hazard Management**

The smoke hazard management systems shall operate in accordance with the requirements of the BCA and the relevant AS1668.1 Standard.

During a detected fire signal the Stair Pressurisation fans will operate to pressurise the Fire escape stairs. Relief air from the Class 3 parts of the building will be via natural ventilation openings in the façade of the building. Relief air from the Class 2 parts of the building will be via central relief air shaft.

## **5.5 Noise and Vibration**

The mechanical systems, including all plant, shall be assessed by the acoustic engineer and treated if required to meet the acoustic performance criteria stated in the Acoustic Report and AS 2107.

## **5.6 Building Automation System**

A computerised Building Management and Control System (BMCS) shall be used to automatically control, monitor and provide alarms for the nominated building services.

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## 6.0 Electrical Services

### 6.1 General

The main features including within the electrical services systems for this building are;

- High Voltage Incoming Supply
- Substation
- Main switchboards
- Power Factor Correction
- Metering
- Distribution Switchboards
- Power reticulation
- General and special purpose power outlets
- Internal and external artificial lighting and controls
- Emergency and exit lighting
- Backbone communications system
- Free to air (FTA) and provision for pay TV systems
- Security systems;
  - Access Control system and Intercommunications system
  - CCTV Surveillance system
  - Intercom
- Earthing and Lightning Protection system (direct and indirect)

### 6.2 Standards and Design

The electrical services installation shall be developed in accordance with the following standards;

- NCC/Building Code of Australia
- Service Rules and Regulations of the local Supply Authority (Endeavour Energy)
- AS3000 – Electrical Installations (Wiring Rules)
- AS3008 – Electrical Installations – Selection of Cabling
- AS3010 – Electrical installations – Generating sets
- AS61439 – Low-voltage switchgear and control gear assemblies
- AS1680 – Interior and Work place lighting
- AS2293 – Emergency Escape and Exit Signage
- AS1768 – Lightning Protection

The communications services installation shall be developed in accordance with the following standards;

- CCM – Communications Cabling Manuals

- AS/ACIF 008 – Requirements for customer cabling products
- AS/ACIF 009 – Installation requirements for customer cabling (Wiring Rules)
- AS3084 – Telecommunications installations

The security services installation shall be developed in accordance with the following standards;

- AS2201 – Intruder Alarm Systems set
- AS4806 – CCTV set

### 6.3 High Voltage Supply and Substation

Local supply authority infrastructure shall have the ability to support the projected maximum demand of the building. The power supply to the building shall be from underground high voltage cables leading in from the Ausgrid Energy triplex network. The High Voltage (HV) feeders shall run underground for the entire route from the Supply Authority power source. The HV cable shall connect to the HV switchgear located on Level 1. The final arrangement of the HV infrastructure shall be subject to the approval of the Authority.

Voltage drop at the final point of connection shall not exceed 7% for dedicated on site substation to AS3000 and power supply Authority.

### 6.4 Standby Power Generation

There is no proposal to provide standby power on the site.

### 6.5 Consumer Mains

Consumers' mains will be provided from the substation to the Main Switchboard (MSB) located in an adjacent room.

Consumer main rated to capacity of transformer with fire performance WS52W rating to AS3013.

### 6.6 Main Switchboard

The main switchboard will be located in close proximity to the substation. Two-hour fire rated protection shall be provided. The main supplies will be divided to supply the following areas;

- Base Building services
- Residential apartments
- Hotel
- Commercial office tenancy spaces

The Main Switchboard will be enclosed assembly type of Form 3 construction and minimum IP42 degree of protection. The switchboard will be floor-mounted, free-standing, front/back connected type.

Instrumentation for Volts (V), Amps (A) and Maximum Demand (MD) will be provided on the incoming consumers mains as well as individual loads, in compliance with BCA requirements for buildings with a floor area greater than 2,500m<sup>2</sup>. Individual loads would be as follows;

- A/C Plant
- Lighting
- Power
- Vertical Transport
- Any other large ancillary plant

Where required the instrumentation will be interfaced to a BMCS for energy reporting.

## 6.7 Power Factor Correction

Power factor correction equipment shall be installed to maintain the power factor at a minimum of 0.95 at all times for the commercial tower base building house services. Space shall be provided for tenants to install their own power factor correction units.

## 6.8 Electricity Metering

Electricity metering equipment comprising of whole current or Current Transformer (CT) metering will be provided generally as follows:

- Base building – Common areas, vertical transport, external lighting etc.
- Hotel – Kitchen Areas, BOH, Hotel Rooms
- Apartments
- Commercial – Separate metering for commercial tenancies.

The meter panels will be grouped together in locations readily accessible.

## 6.9 Reticulation and Cable Management

The Hotel and each Apartment, and Commercial tenant shall be provided with a separate authority metered submain.

The electrical risers shall contain cabling and distribution equipment to serve commercial and retail tenants as well as house/common area requirements.

## 6.10 Power Distribution

Submains will be provided to distribute power to final distribution switchboards and control panels for other services (mechanical, lifts, fire, hydraulic). Submains will be XLPE/PVC copper except when supplying fire essential services loads, which will be the fire rated type.

Submains will be installed on cable trays and arranged in a single path radial format except for typical levels where metered and unmetered rising mains with local tee offs will be used.

## Distribution Boards

House Distribution boards (DB's) shall be readily accessible situated in switchrooms, riser cupboards or plant rooms specifically designed for the purpose. Outgoing circuits shall be protected by circuit breakers.

Retail tenant DBs shall be located to suit the tenants' requirements within the tenancies.

Commercial tenancy DBs shall be located within on-floor fire rated cupboards.

## 6.11 General Purpose Outlets

Power outlets for general purposes and special purposes will be provided, generally as follows:

- Commercial spaces: as required for use by base building e.g. lobbies, lift lobbies, store rooms, riser cupboards, amenities etc, for equipment, cleaning and general usage.
- Toilets, lockers, store rooms: As required for specific purposes (hand dryers, hot water units, boiling water unit, urinal flushing devices and 10 Amp outlets (GPO) for general purposes. In toilets, double GPO will be provided adjacent to each vanity unit.
- Plant and service areas: As required for specific purposes plus a number of 10 Amp IP rated outlets for general purposes.
- Typical Corridor: Double GPO every 12m.
- Typical Lift core area: Double GPO's for general purposes and vending machines.
- Hotel Rooms: To be confirmed during detailed design stage.
- Apartments: To be confirmed during detailed design stage.

General purpose outlets will be circuited with a maximum of 8No. per circuit. Residual Current Devices (RCDs) shall be provided in accordance with AS3000 requirements on final circuits for General Power and Lighting.

## 6.12 Artificial Lighting

Lighting shall be energy efficient, switched lighting and locally controlled. A lighting control strategy shall be implemented appropriate to the application such timers, photocell, dimming etc.

Lighting Emitting Diodes (LEDs) technology shall general be used throughout.

### **Common/House Areas**

Light fittings of type suited to task shall be provided in common/house areas as follows;



- Corridors, stairs, and lift lobbies
- Plant rooms;
- Riser cupboards;
- Toilets, cleaners' rooms, and
- Store rooms.

#### **Office tenancies**

Light of type suited to task shall be provided in office tenancies. Modifications to this lighting will be the responsibility of the tenant.

#### **Hotel Lighting**

Lighting requirements within the hotel apartments shall be the responsibility of the hotel operator.

#### **Apartment Lighting**

Generally LED downlights will be provided within individual apartments.

#### **External Lighting**

External building feature lighting shall be installed to provide interest and to highlight architectural features.

No light beam shall be directed beyond the site boundaries or upwards without falling directly on a surface to minimise light pollution. Lighting will be controlled by photoelectric cells and/or time switches.

### **6.13 Exit and Emergency Lighting**

Emergency and Exit Lighting shall comply with current requirements of the BCA and shall be LED type.

A central computer monitoring system shall be considered for testing, certification and monitoring of the emergency and exit lighting system in all areas.

### **6.14 Lighting Controls**

#### **Common/House Areas**

An automated lighting controller (based on time switch) is to be provided in each house distribution board. Lighting to common areas shall also utilise motion sensing in parallel with the time switch for control.

Motion sensors shall be provided in the toilets and other low-trafficable areas (fire stairs) to control lighting when movement is detected and ensure efficiency and safety is optimised.

External lighting shall be controlled by use of PE cell and digital timeclock.

### **6.15 Earthing**

Earthing systems shall be in accordance with AS3000 for MEN systems.

## 6.16 Lightning Protection

Lightning protection provisions shall be provided in accordance with Australian Standards. An assessment will be carried out to determine the extent of the protection required (direct and/or in-direct protection). The system will utilise the building structure and cladding where possible to avoid additional fixtures and fittings where direct lightning protection is provided.

Surge diverters will be provided in the main switchboard and incoming telecommunication services supplying critical equipment.

## 6.17 Communication Services

### Reticulation and Cable Management

Each commercial tenant, the hotel, and the residential apartments shall be provided with a dedicated incoming communication service cable (fibre and/or copper).

These risers shall contain cabling and some distribution equipment to serve commercial tenants as well as house/common area requirements.

These communications risers will also accommodate security and MATV distribution cabling and equipment.

### MATV

A dedicated clear space will be provided for an MATV antenna located above one of the roof top plant rooms.

A MATV backbone will be provided with antenna and head end equipment. The system will be suitable for digital television signals and Pay TV connections.

## 6.18 Security Services

The development shall be provided with Intruder detection, Access Control & Intercom, and CCTV surveillance. The systems will interface to a security/building managers room for overall monitoring and management.

The standalone security systems headend will be housed in the Base Build communications room, with any necessary data gathering panels distributed within the building risers.

Generally Access Control, Intercom and CCTV will be IP based.

### Monitoring and Intruder Detection

All perimeter doors, fire stair doors, plant room doors and access controlled doors will be monitored via reed switches, with monitoring and alarms via the standalone security head end system. An alarm will sound should doors be left in the open position.

### Access Control & Intercom

Each commercial and retail tenant will be provided with an access control system, which will control access by proximity card or other approved means to:

- Lifts;
- Main Entries;

- 
- Conduits will be provided in the fire stairs for future installation of proximity card access control to allow re-entry on select levels

An intercom facility shall be provided and will be integrated into the base building access control system. The intercom system shall be answered from within the security control room.

### **CCTV System**

The building will be provided with a CCTV surveillance system. CCTV cameras will provide coverage of:

- Building perimeter;
- All entries and exits;
- Main Lobbies;
- Lift cars subject to further assessment.

The cameras will be of high resolution and connected to a digital recording system; either through Digital Video Recorders (DVR's) or hard drive Local Area Network (LAN) based system, providing 30 hours or archive footage storage.

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## 7.0 Hydraulic Services

### 7.1 General

The main features including within the hydraulic services systems for this building are;

- Sewer and Waste Water Drainage
- Sanitary Plumbing
- Trade Waste System
- Potable Cold Water system
- Domestic Cold Water service
- Domestic Hot Water service
- Re-use water (Rainwater) System
- Natural Gas Service
- Stormwater and Roof drainage system

### 7.2 Codes and Standards

All supplied equipment, methods of installation and standards of workmanship shall comply with the relevant technical specifications, procedures, practices and standards:

- National Construction Code (NCC)
- Plumbing and Drainage Regulations
- Department of Fair Trading requirements
- Sydney Water Authority requirements
- City of Sydney requirements
- Jemena Gas requirements
- The Project / Client Design Brief
- Tenancy Brief
- Project ESD Brief
- Fire Engineering Report / Fire Engineering Brief
- Building Surveyors Report
- Fire and Rescue NSW
- Acoustic Report
- All applicable Australian Standards associated with the works
- All requirements of authorities having jurisdiction over the project.

Item	Standards
Sanitary Plumbing & Sewer Drainage	In accordance with AS3500 The National Construction Code Department of Fair Trading Notices Water Authority Requirements
Trade Waste	In accordance with AS3500 Water Authority Requirements
Roof Drainage & Downpipes	In accordance with AS3500 Authority Requirements
Cold Water Services	In accordance with AS3500
Hot Water Services	In accordance with AS3500 Minimum Hot Water temperature 60C
Non Potable Water System	In accordance with AS3500, Water Authority Requirements
Gas Service	AS 5601 Jemena Specific requirements The National Construction Code Department of Fair Trading
Noise criteria	In accordance with acoustic engineer's recommendations.

### 7.3 Sewer and Waste Water Drainage

The project will be provided with fully vented modified sanitary plumbing type installation to comply with AS3500.2 requirements. The sanitary plumbing systems shall gravitate via a series of stacks to the sewer drainage system located below ground level. The sewer drainage system shall connect to the 225mm Sydney Water sewer mains that run down Castlereagh and Pitt streets.

Fixtures unable to gravitate to sewer shall connect to a sewer pumping system located within the basement. Sewer pumping systems shall have dual pumps with 100% standby duty configuration and all associated alarms to ensure adequate notice of failures.

### 7.4 Trade Waste System

Greasy waste shall discharge via a gravity drainage system to the provisional dedicated grease arrestors located in the basement serving the Hotel, and commercial spaces. The grease interceptors shall be sized and configured to meet Sydney Water trade waste requirements.

All grease interceptors will be provided with pump out provision to allow for maintenance.

## 7.5 Potable Cold Water Systems

All areas of the project will be serviced with a potable cold water supply. The cold-water supply shall extend from the authority main in Castlereagh St to a new water meter assembly fitted with backflow preventer located within the water meter room in basement 1 off Castlereagh St. Potable water shall be reticulated to a break tank, pressurised via booster pump and fed up through the building with pressure reducing valves where appropriate to all fixtures and fittings as required.

Separate Utility water metering shall be provided to:

- Hotel stratum,
- Commercial office stratum,
- Individual strata apartments within the residential stratum.

Each residential apartment will be metered via remote reading type meters located on each floor level to comply with Sydney Water metering requirements.

## 7.6 Domestic cold water variable speed pressure sets

Pump-sets shall consist of dual Multistage centrifugal pressure of the variable speed type.

Each pump-set unit shall be complete with variable speed drives, pressure cell, pressure transducers, gauges, and distribution panel all mounted on a mild steel galvanised fabricated base plate frame.

## 7.7 Domestic Hot Water Systems

A domestic hot water system will be provided to supply domestic hot water to all points of usage throughout the building.

The hotel, apartment strata, and commercial office will be each provided separate Domestic hot water systems. Each separate system shall comprise of central gas fired plant with pressurised flow and return piping network and dual circulating pumps. Domestic hot water to be a complete flow and return system reticulated at minimum 60 degrees Celsius to avoid legionella issues.

Each residential apartment will be metered via remote reading type meters located on each floor level.

Localised individual electric hot water units will service garbage areas.

Domestic hot water serving showers and basins shall be temperature controlled via thermostatic mixing valves to maintain temperatures at outlets in accordance with AS3500 requirements.

Pressures at each outlet shall be maintained between 350 and 500 kPa via pressure control valves.

## 7.8 Rainwater Reuse Systems

Rainwater runoff from the upper main roof area will be collected and stored to reduce the use of potable water. Rainwater shall be treated to an acceptable level prior to reticulating to the usage points. It is expected to re-use rainwater for irrigation, toilet flushing and washdown water.

## 7.9 Rainwater Filtration system

A rainwater filtration system shall be installed to pre-treat the rainwater prior to re-use. Each system shall include dual filtration and UV disinfection systems.

## 7.10 Natural Gas Service System

The project will be serviced by an incoming gas supply from the Authorities main located in Castlereagh Street, and extended to the main gas meter room off Castlereagh Street at Basement 1 level subject to approval from Jemena.

Authority gas meters shall be used for billing purposes and the Hotel, Apartment Strata and Commercial Base Building, shall be separately metered from the office component.

- All works shall be in compliance with Jemena's access requirements and shall gain approval from Jemena for the proposed location and access arrangement.

## 7.11 Stormwater and Roof Drainage Systems

The project will be provided with a roof drainage system designed for a 1 in 100 year storm event with 100% overflow provision. The roof drainage system shall discharge to the rainwater tank located in the rooftop plant room. The rainwater tank overflow, along with any stormwater drainage at lower levels, will connect into a 50kL on-site detention tank (size to be confirmed by Sydney Water) located in the level 05 plant deck. The on-site detention tanks, along with any stormwater drainage not connected to the tanks shall discharge to the storm water drain on either side of the building in Castlereagh and Pitt Streets accordance with Council's and Sydney waters requirements.

Any basement level stormwater services below the Authority site connection shall connect to a stormwater pumping system.

Pump-outs shall have dual pumps with 100% standby and all associated alarms to ensure adequate notice of failures.

## Fire Services

### 7.12 General

The main features including within the fire services systems for this building are;

- A combined fire sprinkler / hydrant system
- Fire Hose Reels system
- Automatic Smoke Detection and Alarm System
- Smoke Hazard management system (See Mechanical services)
- Sound Systems and Intercom Systems for Emergency Purposes (SSISEP)
- Portable Fire Extinguishers

### 7.13 Codes and Standards

All supplied equipment, methods of installation, and standards of workmanship shall comply with the relevant technical specifications, procedures, practices and standards:

Item	Standards
Fire Detection & Alarms	AS 1670.1
SSISEP	AS 1668.1
Fire Sprinkler Systems	AS 1670.4
Fire Hydrant	AS 2118.1 – Automatic fire sprinkler systems – General requirements AS 2118.6 - Combined sprinkler & hydrant systems in multistorey buildings
Fire Hose reels	AS 2419.1 – Fire hydrant installations – System design, installation and commissioning AS 2419.2 – Fire hydrant installations – Fire hydrant valves AS 2419.3 – Fire hydrant installations – Fire Brigade Booster Connections AS 2118.6 – 2012 Combined sprinkler & hydrant systems in multistorey buildings
Portable Fire extinguishers	AS2441 – Fire Hose Reels
Electrical work	AS 2444 – Portable fire extinguishers and fire blankets – Selection and location AS/NZS 3000 AS 3013

### 7.14 Combined Sprinkler and Hydrant System

The combined sprinkler and hydrant system shall include the following;

- Connection to the incoming town main connection on Castlereagh Street for the combined sprinkler and hydrant systems.



- 
- Fire Sprinkler and Hydrant Tank located in the Level 5 Plantroom and in the Level 41 plantroom
  - Electric Booster Pump and all associated equipment
  - Diesel Booster Pump and all associated equipment
  - Fast Response sprinklers throughout
  - Wall wetting sprinklers, where required (internal drenchers)
  - Sprinkler spares cabinet
  - Sprinkler Control Assemblies
  - Pressure Reducing Valves
  - Flow Switches
  - Combined Sprinkler and Hydrant Fire Brigade Booster Arrangement and all associated equipment located on Castlereagh Street and Pitt Street.
  - Jockey Pump for pressure maintenance
  - Remote test valves
  - Internal hydrants
  - Pipework and associated valves, equipment, fittings and fixings
  - Pressure Switches
  - Pressure Gauges
  - Fire Brigade Alarm Line
  - Monitoring and Controls, including isolation valve monitoring
  - Wiring
  - Combined Sprinkler and Hydrant Block plan
  - Locks and straps
  - Water Supply Proving Test Arrangements
  - Fire water tank associated equipment, including Flow Control & level Control inlet valves.

## Design Criteria

The design criteria for the sprinkler system will be as follows:

Occupancy	Hazard Class	Discharge Density mm/min	Assumed Operation Area
Residential Apartments			
Hotel			
Restaurants and cafes	OH1 to 3	5	72 to 216m <sup>2</sup>
Plant	OH1	5	72m <sup>2</sup>
Commercial/Office	LH	2.25	84m <sup>2</sup>

For the Hydrants the following design criteria shall apply:

Building classification:	2 & 3
No. of hydrants to operate simultaneously:	1
Minimum flow rate:	10 L/s total at the most hydraulically disadvantaged hydrants (10 L/s each)
Minimum outlet pressure each hydrant outlet non-boosted:	700 kPa @ 10 L/s for each hydrant
Minimum outlet pressure when boosted:	700 kPa
Building classification:	5
No. of hydrants to operate simultaneously:	1
Minimum flow rate:	10 L/s total at the most hydraulically disadvantaged hydrants (10 L/s each)
Minimum outlet pressure each hydrant outlet non-boosted:	700 kPa @ 10 L/s for each hydrant
Minimum outlet pressure when boosted:	700 kPa

## Wet Sprinkler Control Assemblies

Sprinkler control assemblies shall be located at each storey in a common fire rated exit in accordance with AS 2118.6.

Include in the sprinkler control valve assembly and associated components everything necessary for the function of the system in accordance with AS 4118.1.2 and at least the following:

- Main Stop Valve: O.S & Y type or butterfly valve, with flange or roll grooved connection, hand wheel, right handed
- Check Valve: Flanged or roll grooved connection, installed immediately above each main stop valve. Mount approximately 1400 mm above the floor level
- Connection to fire trip direct Local Fire Brigade alarm and pumps

- Flow switch and solenoid valve arrangement with system test drain
- Installation pressure gauges
- Block plan
- Emergency instructions
- A location plate
- A notice above the mains top valve identifying the installation and the area served by the installation

## 7.15 Isolation Valve Criteria

The pressure zone shall incorporate isolation valves so that not less than 75% of fire hydrants in that zone and not less than 50% of fire hydrants at each floor level remain operable upon isolation of any section of the fire ring main.

Isolation valves shall also be located such that not more than four storeys of sprinklers can be isolated.

In addition, isolation valves shall be located as follows;

- On each arm of the ring main, adjacent to the connection with the supply pipe.
- On branches into buildings, adjacent to the tapping in the ring main, in a position considered to be accessible under fire conditions.
- On branches supplying more than one fire hydrant, adjacent to the tapping in the ring main.
- On branches supplying a sub-ring main, adjacent to the tapping in the ring main.
- On the ring main, remote from the source of supply.
- On any interconnection within the ring main, on the cross-connecting pipe adjacent to the ring main, and on the ring main on each side of the cross-connecting pipe.
- On ring mains supplied by separate sources, isolating valves shall be located at the point of connection with each source.

All ring main isolating valves shall be so located as to permit ready access by fire brigade personnel.

## 7.16 Pressure Reducing Valves

Pressure reducing valves are to be provided in accordance with AS 4118.1.8. and the manufacturer's specific installation requirements. They shall be provided to prevent the total maximum static pressure in the system exceeding 1200 kPa at any sprinkler head or 1300 kPa at any fire hydrant. Isolation valves are to be provided either side of the pressure reducing valve for maintenance purposes.

## 7.17 Flow Switches

Flow Switch Zoning shall align with fire detection and zone smoke control zones where practical and fitted with flow switch and test facilities drain to the stormwater tank or to a sump / pump out pit provided by the hydraulic trade.

Supply and install on the main sprinkler branches to each floor, downstream of the floor level main stop valve, a flow switch in an accessible location.

Flow switches are to be single pole, magnetic switch or paddle type, low restriction on/off type. Sensitivity to suit minimum flow, with pneumatic retard or time delay.

Each flow switch shall be wired back to the Fire Indicator Panel on separate alarm zone facilities in accordance with AS 1670.1.

A solenoid operated water flow test drain shall be fitted on the system side of each flow switch fitted with a solenoid test valve in an accessible position. Each valve shall be labelled "Flow Switch Test Drain Level ....." and wired back to the fire indicator panel to enable testing to be carried out.

The test drains shall be sized for the water flow necessary to operate the flow switch but less than the flow from a single activated sprinkler.

## 7.18 Hose Reels

Hose reel system will be supplied from the combined sprinkler and hydrant riser. Hose reels are to be located in a visually unobtrusive, but accessible position and are to be within 4m of the entry door to the fire stairs or fire passageway or non-fire rated required exits. The system will be designed in accordance with AS 2441-2005.

Fire hose reels will be a minimum of 36 metres long.

## 7.19 Automatic Fire Detection and Alarm System

A smoke detection System & alarm system is required in accordance with BCA, AS 1670.1, AS/NZS 1668.1.

The system shall be an automatic fully addressable fire detection and alarm system that is controlled and monitored by a Fire Indicator Panel (FIP) located in the building entry foyer.

The Automatic Detection and Alarm System will be interconnected with the BMS, combined sprinkler and hydrant system, Sound Systems and Intercom Systems for Emergency Purposes (SSISEP).

The FIP will incorporate a Fire Fan Control Panel (FFCP) that will automatically and manually control the ventilation and air distribution systems throughout the entire site for the control of smoke in accordance with AS 1668. The Fire Fan Controls will be zoned per facility.

The FIP will consist of Alarm Signalling Equipment (ASE) for automatic notification of a fire alarm to the Fire Brigade via a third party monitoring provider.

The fire panels will be provided with a minimum of 20% spare capacity.

Detectors will be selected and positioned to suit the risk and to mitigate the possibility of false alarms.

## **7.20 Sound System & Intercom System for Emergency Purposes (SSISEP)**

A SSISEP shall be provided throughout the entire site in accordance with the latest BCA referenced standards AS 1670.4 and the Fire Engineering Report.

The system shall be controlled and monitored by a Master Evacuation Control Panel (MECP) located in the building entry foyer, directly adjacent to the FIP.

The SSISEP will be automatically initiated by the combined sprinkler and hydrant system and the Automatic Detection and Alarm System. Manual actuation will be achieved via white emergency call points (ECP) located within the fire hose reel cupboards.

Speakers will be selected and located to ensure the required speech intelligibility and sound pressure is delivered to all occupied areas. In areas where speech intelligibility performance cannot be achieved due to the layout constraints of the occupancy an alternative solution will be carried out e.g. plant areas.

The SSISEP will be combined with the front of house public address system. The SSISEP functions will receive higher priority than other sound reinforcement announcements. The public-address functions will allow for zoned distribution of public announcements throughout the facilities. Control consoles for public information announcements will be provided at all reception, fire control room, security control, management control areas.

The SSISEP speakers will achieve the required speech intelligibility and sound pressure levels.

Warden Intercom Points (WIP's) will be provided per alarm zone, at the building's main entry point and designated emergency lifts. The SSISEP will allow controlled evacuation of the facilities during a fire, including zoned and cascading evacuation.

The SSISEP evacuation stored voice message may incorporate multi-lingual messages in order to improve overall evacuation procedures.

The SSISEP panels will be provided with a minimum of 30% spare capacity.

## **7.21 Portable Fire Extinguishers**

Portable fire extinguishers are to be provided throughout the development to comply with BCA table E1.6 and selected, located and distributed in accordance with sections 1 to 4 of AS 2444.

All extinguishers shall be complete with appropriate mounting boards, mounting brackets, nozzles, hoses, operation instructions and location signs.

## Selection and Location

Risk	Equipment Type and Rating	Preferred Location
Essential Service Switchboards	4.5 kg Dry Chemical Powder (4A 60B:(E)) or Carbon Dioxide 5 kg (5B(E))	Between 2m and 20m from essential service switchboards.
Electrical Switch Rooms	4.5 kg Dry Chemical Powder (4A 60B:(E)) or Carbon Dioxide 5 kg (5B(E))	Adjacent to and internal side of entry door between 2m and 5m maximum.
Plant Rooms	4.5 kg Dry Chemical Powder (4A 60B:(E)) or Carbon Dioxide 5 kg (5B(E))	Adjacent to and internal side of entry door between 2m and 5m maximum.
Commercial Kitchens (cooking oils and fats)	7Ltr Wet Chemical (2A:4F) including 1.8 m x 1.8 m Fire Blanket.	Adjacent to exit door and accessible from cooking area, between 2m and 20m maximum.
Throughout the entire site	4.5kg Dry Chemical Powder (4A 60B:(E))	Within 2m of each Fire Hose Reel.

## 7.22 Interfaces with other systems

Operation of the building services in fire mode requires interfaces with other services. Interfaces will be provided between the fire detection system and the following building services:

- Mechanical ventilation used for smoke hazard management
- General air conditioning systems
- Building management systems
- Security and access control devices
- Automatic door operators.

## 8.0 Conclusion

The Pitt Street North Site is well serviced with respect to the provision of Utilities including Electrical, Communications, Water, Sewer, and gas with all main utilities located relatively close to the site.

Based on preliminary consultation between Sydney Metro and the relevant Utility Services Providers, it is believed that there is sufficient capacity in existing infrastructure to accommodate the proposed indicative OSD Design. Further consultation will be required in later design stages should the design be modified.

The Utilities have been made aware of and acknowledged the proposed services loads for the OSD as proposed. These loads have been based on the building design proposed and take into account the ESD targets as outlined in ESD report at Appendix Q.

## 9.0 Appendix