John Holland Group

Air Quality Management Plan – Construction Works

Waterloo Over Station Development – Southern Precinct

9 March 2023

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Abbreviations

Term	Definition
ACM	Asbestos Containing Material
AHD	Australia Height Datum
AIOH	Australian Institute of Occupational Hygienists
AQA	Air Quality Assessment
AQMP	Air Quality Management Plan
ASS	Acid sulfate soil
AST	Above ground storage tank
bgs	below ground surface
BTEX	Benzene, toluene, ethylbenzene, xylene
CBD	Central Business District
CLM Act	Contaminated Land Management Act 1997
COPC	Contaminant of potential concern
DA	Development Application
DDR	Dust Deposition Rates
DEMP	Demolition Environmental Management Plan
DP	Deposited Plan
DSI	Detailed Site Investigation
EPA	NSW Environment Protection Authority
HMBS	Hazardous Materials Building Survey
JBS&G	JBS&G Australia Pty Ltd
JHG	John Holland Group
LAA	Licensed Asbestos Assessor
LPI	NSW Land and Property Information
NATA	National Association of Testing Authorities (NATA)
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
OSD	Over Station Development
PAH	Polycyclic Aromatic Hydrocarbons
PASS	Potential acid sulfate soil
PCB	Polychlorinated biphenyls
PFAS	Per-and-poly-fluoroalkyl substances
$PM_{(2.5/10)}$	Particle Matter (number indicates particle diameter in micrometres/micron)
POEO Act	Protection of the Environment Operations Act 1997
PPE	Personal Protective Equipment
RAP	Remedial Action Plan
RCS	Respirable Crystalline Silica
RL	Relative Level
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SPOCAS	suspension peroxide oxidation combined acidity
SSD	State Significant Development
SVOC	Semi-volatile organic compounds
SWA	SafeWork Australia
SWNSW	SafeWork New South Wales
TRH	Total Recoverable Hydrocarbon
TSP	Total Suspended Particulate
UST	Underground storage tank
VOC	Volatile Organic Compound

1. Introduction

1.1 Introduction and Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by John Holland Group Pty Ltd (JHG, the client) to prepare this air quality management plan (AQMP) for the development site known as the Southern Precinct over station development (OSD) at the Waterloo Metro Quarter site (herein referred to as 'the site').

Development consent for the development works at the site has been obtained from the Department of Planning as SSD 10437. The consent conditions require that the Construction Noise and Vibration Management Plan (CNVMP) prepared for the construction phase of works must be updated to include an AQMP applicable to the critical state significant infrastructure (CSSI) stations works. Specifically Conditions C23 to C25 of SSD 10437 which relate to the requirements of this AQMP are summarised in **Table 1.1** below.

Table 1.1: Requirements of AQMP as Specified in Consent SSD10437

SSD 10437 Conditions C23 to C25	Addressed in
"C23. Prior to the commencement of any earthwork or construction, the Applicant shall:	
(b) prepare an Air Quality Management Sub-Plan (AQMP) for the development, independent of the AQMP approved with the CSSI station works. The AQMP must be submitted to the Planning Secretary for approval and a copy provided to the Certifying Authority. The Sub-Plan must include, as a minimum, the following elements:	**Sections 2** to **7** of this AQMP
(i) be prepared by a suitably qualified and experienced expert in accordance with the EPA's Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (the Approved Methods);	Engagement of JBS&G's Team for air quality impact for preparation of this AQMP.
(ii) relevant environmental criteria to be used in the day-to-day management of dust and volatile organic compounds (VOC/odour);	**AQMP01, Appendix B**
(iii) mission statement;	**Section 1.3**
(iv) dust and VOCs/odour management strategies consisting of: • *objectives and targets;* • *risk assessment;* • *suppression improvement plan.*	**Section 5.3 and AQMP01, Appendix B**
(v) monitoring requirements including assigning responsibility (for all employees and contractors);	**Section 5.4**
(vi) communication strategy; and	**AQMP07, Appendix B**
(vii) system and performance review for continuous improvements.	**AQMP08, Appendix B**
C24. The Sub-Plan must detail management practices to be implemented for all dust and VOC/odour sources at the site. The Sub-Plan must also detail the dust, odour, VOC and semi-volatile organic compounds (SVOC) monitoring program (eg. frequency, duration and method of monitoring) to be undertaken for the project.	**Section 5.3 and AQMP01, Appendix B**
C25. The Applicant must also develop and implement an appropriate comprehensive Reactive Air Quality and Odour Management Plan which will incorporate an Ambient Air Monitoring Program and Reactive Management Strategy to ensure that the assessment criteria are met during the works."	**AQMP04, Appendix B**

1.2 Objective and Scope of work

The objective of the AQMP is to provide a plan designed to ensure that the requirements of conditions C23 to C25 of SSD 10437 are met, and that potential onsite and offsite air quality impacts

which may occur as a result of the proposed development are controlled and/or mitigated in an acceptable manner. The plan requires the implementation of a number of ongoing monitoring and management measures pertaining to the proposed demolition/construction works. The AQMP is intended to form part of the CNVMP being prepared for the site by JHG.

1.3 Mission Statement

In light of the objectives listed above, the mission statement for this AQMP is considered to be as follows.

This AQMP has been prepared to ensure that construction activities occurring as part of the Southern Precinct over station development (OSD) at the Waterloo Metro Quarter are managed to:

- meet NSW Environment Protection Authority (EPA) endorsed air quality and odour objectives;
- provide a reactive monitoring regime to allow early detection of air quality and odour issues associated with construction, and allow a realtime assessment of various activities on the site; and
- effectively manage excavation/construction activities to prevent potential offensive odour and/or unacceptable emissions to air.

2. Site and Project Details

The Environmental Impact Statement (EIS) prepared for development at the site in '*Environmental Impact Statement, Waterloo Metro Quarter Over Station Development - Southern Precinct, Detailed State Significant Development Application*' Urbis Pty Ltd, document WMQ-BLD3-EIS-RPT-00326 revision 5, dated 26 October 2020 (Urbis 2020) presented a comprehensive discussion of site details. The details which are relevant with respect to management of potential dust and air quality impacts are summarised in the following sections.

2.1 Site Area

The Waterloo Metro Quarter is located within the City of Sydney Local Government Area (LGA). The site is situated about 3.3 kilometres south of Sydney CBD and eight kilometres northeast of Sydney International Airport within the suburb of Waterloo.

The Waterloo Metro Quarter site comprises land to the west of Cope Street, east of Botany Road, south of Raglan Street and north of Wellington Street (**Figure 2**). The heritage-listed Waterloo Congregational Church at 103–105 Botany Road is within this street block but does not form a part of the Waterloo Metro Quarter site boundaries.

The Waterloo Metro Quarter site is a rectangular shaped allotment with an overall site area of approximately 1.287 hectares.

The Waterloo Metro Quarter site comprises the following allotments and legal description at the date of this report. Following consolidation by Sydney Metro, the land will be set out in Lot 190 in deposited plan (DP) 1257150. The Waterloo Metro Quarter - Southern Precinct (i.e. the site) has an area of approximately 4830m^2.

The boundaries of the overall site are shown on **Figure 1**, and the current site layout is shown on **Figure 2**.

2.2 Proposed Development - Waterloo Metro Quarter

The Waterloo Metro Quarter OSD comprises four separate buildings, a basement carpark and public domain works adjacent to the Waterloo Metro station.

Separate SSD DAs were submitted concurrently for the design, construction and operation of each building in the precinct;

- Southern precinct SSD-10437 (i.e. for the area of the site covered by this AQMP);
- Basement Car Park SSD-10438,
- Central precinct SSD-10439, and
- Northern precinct-SSD-10440.

While Urbis (2020) provides an overview of all precincts, the details presented in here have been limited to the area of the site (i.e. the Southern Precinct) as appropriate for the AQMP.

2.2.1 Southern Precinct

The consent received for SSD-10437 permits construction of the following facilities at the site:

- 1 x 25-storey residential building (known as Building 3) comprising student accommodation, to be delivered as a mixture of studio and twin apartments with capacity of 474 students;
- 1 x 9 storey residential building (known as Building 4) above the southern station box to accommodate 70 social housing dwellings;
- ground level retail tenancies including Makerspace, student accommodation lobby and gymnasium lobby, and loading facilities;

- level 1 and level 2 gymnasium and student accommodation communal facilities;
- landscaping and private and communal open space at podium and roof top levels to support the residential accommodation;
- new public open space including the delivery of the Cope Street Plaza, including vehicle access to the site via a shared way from Cope Street, expanded footpaths on Botany and Wellington Streets and public domain upgrades;
- signage zone locations;
- utilities and service provision; and
- stratum subdivision (staged).

The extent of these works on the site in the context of the full Waterloo Metro Quarter development are shown in **Figure 3**.

2.3 Surrounding Environment

The area surrounding the site consists of a mix of commercial, residential and light industrial uses, civic uses and open space. Urbis (2020) provided the following summary of land uses on adjacent properties to the site or on properties across adjacent roadways to the site.

- North: Raglan Street forms the northern boundary of the site. On the northern side of Raglan Street is a mix of one and two-storey commercial buildings with ground floor retail. Further to the north is Redfern Station and Town Centre which is characterised by a mix of residential, retail and student accommodation uses. Redfern Park is located approximately 500m north-east of the site and is a well-used recreational space with a grassy recreational park, sports fields, grandstand, and children's playground;
- East: Waterloo Estate, comprising land bounded by Cope, Raglan, George, Wellington, Gibson, Kellick, Pitt and McEvoy streets, which has an approximate site area of 12.32 hectares (approximately 65% of the total estate). It currently comprises 749 social housing dwellings owned by the NSW Land and Housing Corporation, 125 privately owned dwellings, and some commercial properties on the south-east corner of Cope and Wellington Streets;
- South: Land to the south of the site is characterised by a mix of low to mid rise industrial, commercial and residential buildings. Immediately to the south of the site on the opposite side of Wellington Street is the Cauliflower Hotel, a locally listed heritage item. Further to the south along Botany Road are a mix of residential apartments and row of terraces. Alexandria Park, a large area of public open space is located to the south-west of the site. Green Square Station and Green Square Town Centre are located approximately 800m south of the site.
- West: Botany Road forms the western boundary of the site. Beyond Botany Road to the west are two and three-storey commercial and light industrial buildings, as well as a five-storey mixed use residential flat building. Further to the west is the Alexandria Park Heritage Conservation Area (HCA). The HCA comprises a mix of late nineteenth-century houses including one to three-storey terraces and cottages. The area also includes corner shop buildings, industrial and warehouse buildings. South Eveleigh is a business and technology centre in Eveleigh, located approximately 400m north-west of the site.

The nearest sensitive receptors to the site are shown on **Figure 4**.

2.4 Meteorological Conditions

Average climatic data obtained indicated the site's meteorological setting is characterised by average minimum temperatures which vary from 10.5^{o}C in July to 20.5 ^{o}C in February; average

maximum temperatures which vary from 17.3 ^{o}C in July to 24.8 ^{o}C in January; average annual rainfall of approximately 1079 mm with rainfall greater than 1 mm occurring on an average of 100 days per year; monthly rainfall varies from 60 mm in September to 125 mm in July.

3. General Air Quality in the City of Sydney

Air quality in the Sydney region is impacted by a range of air pollution emissions sources including major industry, motor vehicles and watercraft, commercial operations and leaking pipes and tanks as well as from domestic activities such as solid fuel heaters. Major pollutants that may potentially be emitted by the proposed earthworks have been identified as follows:

Fine Particles

Particles (or particulate matter) in the atmosphere come from a wide variety of sources, including soil (dust), vegetation (pollens and fungi), sea salt, fossil fuel combustion, biomass burning and industrial activities. Particles in the atmosphere typically exhibit a bi-modal size distribution with a peak in the range of 0.1-2.5µm and a second peak in the range 2.5-50µm. As a result, particles with a diameter of up to 2.5µm ($PM_{2.5}$) are commonly referred to as fine particles. There is also a distinction in the health effects of different sized particles. Particles up to about 10µm (PM_{10}) diameter are inhaled, whereas larger particles are not. On this basis, the term 'fine particles' is often used to refer to PM_{10}.

Coarse Particles

Coarse particles remain in the air for relatively short periods of time and are therefore generally not carried long distances. As a result, coarse particles tend to be a local rather than a regional problem, occurring close to industrial sources such as metal processing plants and mining operations. The level of particles in the atmosphere is determined by measurement of their mass. In the greater metropolitan area two methods of measurement are commonly used, total suspended particulates (TSP) and dust deposition rates (DDR). While the mass determined by these measures will include fine particles, these will generally only make a small contribution. Therefore, measurements of TSP and DDR are used to provide an indication of the level of coarse particulates in the atmosphere.

Concerns about coarse particles are generally more in terms of nuisance such as damage to or soiling of materials, or adverse effects on sensitive vegetation through surface coating.

Air Toxins

Another group of air pollutants which can be hazardous to human health, even at low levels, are toxic compounds known as air toxins. This group includes chemicals such as benzene, formaldehyde, chlorinated hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and dioxins. Trace amounts of many of these chemicals have been detected in air in urban environments in a number of areas around the world.

In recent years there has been increasing community concern about air toxins in ambient air and the associated health effects. These compounds may cause cancer, gene mutation, reproductive malfunction, affect foetal development, or have neurotoxic effects. While the levels that endanger public health have not been established, it is believed that even very low levels, particularly under long term exposure, could have adverse effects. Many air toxins are highly volatile and evaporate readily into the air following inhalation.

Odour

Odour is measured using panels of people who are presented with samples of odorous gas diluted with decreasing quantities of clean odour-free air. The panellists report when the smell becomes detectable. Odour in air is quantified in terms of "odour units" which is the number of dilutions required to bring the odour to a level at which 50% of the panellists can just detect the odour. This process is known as olfactometry.

Background levels of odour in the environment can vary enormously based on a range of factors.

3.1 Regulatory Requirements

Demolition activities on site will be required to be completed in accordance with several sections of environmental and occupational health and safety legislation and associated regulations. The primary Acts, Regulations and Guidelines are listed below with a brief summary of their applicability. Please note that this list is not intended to be a comprehensive listing of acts and regulations. The site owner and contractors are required to satisfy themselves that all applicable permits, licences and legislation have been obtained and their conditions satisfied.

Environmental Planning & Assessment Act 1979

The overarching Act to institute a system of environmental planning and assessment for NSW.

Work Health and Safety Act, 2011

The overarching Act for NSW setting law relating to employee health and safety and employer responsibilities.

Work Health and Safety Regulation, 2017

Sets Regulations and details the duties for employers to achieve required employee health and safety performance.

Protection of the Environment Operations Act 1997

The POEO Act is the key piece of environment protection legislation administered by the EPA.

***National Environment Protection (Ambient Air Quality) Measure* (NEPC 2021)**

National guidelines for the assessment of ambient air quality. These guidelines provide national air quality standards and criteria for a range of pollutants.

Protection of the Environment Operations (Clean Air) Regulation 2021

Guidelines outlining regulatory requirements for various activities which may affect air quality, including air impurities emitted from activities or plant.

Approved Methods for the Modelling and Assessment of Air Pollutants in NSW 2016

NSW regulatory guidelines outlining the methods for detailed quantitative and qualitative air quality assessments from stationary sources.

***Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition, 2005, Australia National Occupational Health and Safety Commission* (NOHSC 2005)**

Guidelines for the assessment of airborne asbestos fibres including relevant workplace exposure standards.

4. Proposed Construction Works

4.1 Proposed Construction and Demolition Works

As discussed in **Section 2.2** the site is proposed to be redeveloped as a mixed-use precinct, comprising two residential buildings with podium non-residential uses and public domain improvements including the construction of Cope Street Plaza.

Table 4.1 provides a broad summary of the works required to complete the proposed redevelopment.

Table 4.1: Proposed Plan of Site Redevelopment Works

Task	Description
1	**Site Establishment** including: - Installation of Hoardings (along site boundaries); - Installation of Gates and Other Physical Security Measures - Project Office Setup (likely within existing structures) - Setup of Workforce Accommodation (likely in temporary sheds brought onto the secured site)
2	Remediation of and Contamination and Archaeological Investigations (will be completed under a separate (and existing consent). These impacts with respect to air quality have therefore not been considered as part of this AQMP.
3	**Student Accommodation Building – Substructure.** This will broadly comprise: - Site preparation to modify hoardings, establish site facilities and environmental controls - Commence foundation piles, including spoil removal and associated groundwater capture. - Partial demolition of existing concrete hardstand and partial demolition of the station's temporary shoring wall inclusive of off-site disposal. - Excavate and remediate zones for deep soil requirements under the supervision of an archaeologist and environmental consultant. - Build retaining walls, and commence detailed excavation to form, reinforce, and pour concrete (FRP) pile caps, lift pits and crane base - Import backfill material and lay/compact to underside of ground slab - Detail excavation, FRP and backfill around remaining pile caps - Form reinforce and pour the ground slab - - - Site preparation to modify hoardings, establish site facilities and environmental controls - Commence foundation piles, including spoil removal and associated groundwater capture - Partial demolition of existing concrete hardstand and partial demolition of the station's temporary shoring wall inclusive of off-site disposal. - Excavate and remediate zones for deep soil requirements under the supervision of an archaeologist and environmental consultant. - Build retaining walls, and commence detailed excavation to form, reinforce, and pour concrete (FRP) pile caps, lift pits and crane base. - Import backfill material and lay/compact to underside of ground slab. - Detail excavation, FRP and backfill around remaining pile caps. - Form reinforce and pour the ground slab.
4	**Student Accommodation Building – Above ground works.** This will broadly comprise: - Construction of the podium from Ground Floor to Level 3 as post tension reinforced concrete slabs. Scaffold to be installed for edge protection around the podium. - Construction of 22 levels of student accommodation above Level 3 as post tension reinforced concrete slabs. Screens to be installed for edge protection around each level. Based on the size of the typical floor footprint, each level will be poured in two pours generally on a 6-day cycle. The Façade for the buildings will be brickwork, cladding and curtain wall/windows, with works typically trailing the leading slab by four storeys. Roof level façade will be a steel plant screen.. Internal fit out requirements will be finalised at a later stage.
5	**Social Housing Building – Foundation slab** (atop Waterloo Station – Station Box) This will broadly comprise - Placement of a low height suspended slab between the top of the station box and the full footprint of the social housing floorplan.
6	**Social Housing Building – Residential Levels** - Construction of 9 levels of housing above the founding slab as post tension reinforced concrete slabs. - Install scaffolding to cantilever over the Eastern edge (Cope Street) of the station box, and as edge protection surrounding the building. Formwork screens will be used as edge protection in some locations.

Task	Description
	- After completion of the founding slab works, typical floor construction will commence. There are a total of 9 storeys in the building. The structure consists of a lift core and central core box for stairs. Typical floor structure consists of post tensioned reinforced concrete flat slabs which will be formed using table forms or similar. - Façade for the buildings will primarily involve window walls and brickwork, with works typically trailing the leading slab by four storeys - The fitout works will commence after façade installation.
7	**Cope Street Plaza** Landscaping and resurfacing across this area once tower cranes for the Southern Precinct building construction have been demobilised.

4.2 Timeline and Staging

Urbis (2020) estimated that the construction works for the proposed site development will be undertaken over a period of 2.5 years.

4.3 Equipment

Various plant and equipment will be used for completion of the proposed redevelopment works. Two tower cranes will be required along with:

- a number of hoists and loading platforms;
- one or more piling rigs for foundation installation;
- static concrete booms for concrete supply; and
- heavy vehicles and/or excavators for structural demolition, movement of materials onto and across the site.

5. Potential Sources of Air Emissions

The remediation action plan (RAP) prepared for the site (JBS& 2023) states that:

"… there are no previously identified impacts within this portion of the site that require management and / or remediation in order to make the site suitable for the proposed land-use. It is understood that only minor excavations are required in this portion during future construction works (to facilitate the installation of services etc). As such, subject to the appropriate disposal of any surplus materials (Section 6.5) and the implementation of the unexpected finds protocol (UFP) (Section 7.6) during site development works, it is considered that this portion of the site will be suitable for the proposed use."

As such it is considered that emissions to air resulting from the excavation or disturbance of in-situ soils on the site will not be a source of common urban contaminants, and the main potential sources of emissions to air for this project will be the proposed demolition and construction works. Furthermore given that the likelihood of emissions to air arising from the proposed works is very low, it is also considered that the UFP can be used to manage these instances (if any).

Based on the anticipated scope of demolition and construction works required at the site (**Section 4**), several potential sources of air emissions have been identified which are summarised in **Table 5.1**. Each type of emission is briefly described in **Sections 5.1** and **5.2**.

Table 5.1 Summary of Potential Air Emissions (Demolition Phase)

Works	Potential Air Emissions
Demolition of concrete structures	Particulates, including dust
Haulage of demolition wastes across site roads	Particulates, including dust
Handling and management of piling spoil	Particulates, including dust
New building construction	Particulates (i.e. dust) and intermittent odours
Operation of heavy vehicles for demolition works	Exhaust emissions

Asbestos has not been included in the list of potential air emissions given that the proposed scope of works is predominantly above ground, and that previous remediation works have removed all known detections of asbestos identified across the full OSD area. It is also noted that the project documentation indicates that construction of the Southern Precinct will commence predominantly on a site that has been remediated and validated as suitable for the intended use.

It is also noted that Conditions C23 to C25 of consent SSD 10437 make specific reference to emissions to air of SVOCs and VOCs during the proposed constructions works. However given that no sources of VOCs / SVOCs exist within the boundaries of the Southern Precinct it is considered that emissions to air of VOCs or SVOCs due to the proposed scope of redevelopment works would be minimal, if any.

5.1 Particulates (Dust)

Demolition works will be undertaken by excavators used to hammer, rip and break the concrete pavements into smaller pieces. Demolished materials will then be stockpiled on site for transport off-site at a later stage. The greatest potential for the release of particulates will be during breaking of the site structures.

Piling and the transport/handling of piling spoil will also take place with limited potential for particulate emissions.

Particulate emissions as potentially generated from the stockpiling of materials are considered to be minimal.

Without implementation of adequate mitigations measures, dust emissions from the activities listed in **Table 5.1** would result in reduced local air quality and dust deposition at nearby sensitive receivers to the construction works on the site.

5.2 Odour

Odour is a sensory response to the inhalation of one or more chemicals in the air we breathe. A person's perception of an odour can vary significantly depending on the sensitivity of the person, the acuteness of the person's sense of smell and the connotations that the odour bestows on that person. Odour may affect a person's quality of life and can have a large range of effects including stress and other physical symptoms.

5.3 Exhaust Emissions

It is anticipated a range of fuel powered plant, machinery and equipment will be required to facilitate demolition and construction activities, however no bulk fuel storage is anticipated on site. As such, potential emissions/air quality impacts have been identified as principally associated with exhaust fumes generated by plant, machinery or equipment use.

Diesel and petroleum combustion is a well-known process and regulated in accordance with relevant emission standards as prescribed by the NSW EPA. Exhaust emissions will be anticipated from construction machinery as engaged on the site. However, noting the proximity of the site to the Sydney central business district (CBD) with substantial motor vehicle activity, these are anticipated to be insignificant in comparison to existing levels of exhaust-based constituents in the surrounding area.

5.4 Required Emissions and Controls

With the exception of exhaust, all emissions listed in **Table 5.1** have the potential to become significant. As such a program of controls and air monitoring should be undertaken throughout the duration of the works as summarised in **Table 5.2.**

Table 5.2: Key Features of Air Quality Management Required During the Proposed Redevelopment

ID	Mitigation Measure	Responsibility	Duration
Administration of AQMP and Monitoring Requirements			
01	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site[1].	JHG Project Manager	Prior to and during construction.
02	Display the name and contact details of person(s) accountable for air quality issues on the site boundary[2].	JHG Construction Manager	During Works
03	Develop plans for dust, odour and VOC management as part of the AQMP. The AQMP may include monitoring of dust deposition, dust flux, realtime PM10 continuous monitoring and/or visual inspections	JHG Construction Manager	During Works
04	Record all dust and air quality complaints.	JHG Construction Manager	During Works
06	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book[1].	JHG Construction Manager	During Works
05	Make the complaints log available to the local authority when asked.	JHG Construction Manager	During Works
07	Undertake weekly on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, odour and VOCs, record inspection results, and make the log available to the local authority when asked..	JHG Construction Manager	During Works
08	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	Environmental Consultant	During Works
Project Actions to Reduce Air Quality Impacts			

09	Spraying formations and exposed work areas to suppress dust using water carts and other suitable equipment	JHG Construction Supervisors All personnel	During Works
10	Minimise traffic on exposed areas – create designated haul roads	All personnel	Prior to works
11	When using machinery to handle dusty/dust-generating materials, minimise the distance between where the material is stored and its final location	All personnel	Prior to works
12	Cover haul vehicles loads & ensure tail gates are closed when operating on public roads. Vehicles carrying loose or potentially dusty material to or from the Project area should be adequately covered	All personnel	During Works
13	Water would be sprayed on unsealed access roads and open areas during conditions conducive to dust generation	All personnel	During Works
14	On-site vehicle speed limits would be established and enforced to prevent dust emissions	All personnel	During Works
15	Stockpiled material should be appropriately managed and shaped to reduce wind erosion and covered as appropriate	All personnel	During Works
16	During extreme weather events where dust generation cannot be effectively minimised (such as high winds), dust generating works would cease until adequate controls can be implemented or until adverse weather conditions subside	Construction Manager	During Works
17	Remove mud from haul vehicles prior to entering public roads. A wheel cleaning/washing system may be established for vehicles entering/leaving sit	All personnel	During Works
18	Reprogram dust generating work during periods of high wind	Construction Manager	During Works
19	Provide awareness training in the need to minimise dust during site inductions and toolbox talks	Construction Manager	During Works
20	Regular visual monitoring of dust generation	Construction Manager	During Works
21	Plant and equipment will be serviced and maintained in good working order to reduce unnecessary emissions from exhaust fumes. Maintenance of Plant & Equipment as per manufacturers requirements	All personnel	During Works
22	Plant, machinery and vehicles would be turned off while not in use, where safe to do so	All personnel	During Works
23	Construction plant, machinery or vehicles producing excessive visual exhaust would be turned off, tagged 'out of order' and not used	All personnel	During Works
24	All emission controls used on vehicle and equipment would comply with standards listed in Schedule 4 of the Protection of the Environment Operations (Clean Air) Regulation 2010	All personnel	During Works
25	In the event that odour emissions are generated beyond the site boundaries then, work would cease until the source and nature of the odour can be determined and an appropriate course of action carried out. This may include further assessment to determine potential impacts on the nearest sensitive receptors.	Construction Manager	During Works
26	If air quality complaints occur as a result of works, works would cease and dust/odour generating activities would be re-assessed to reduce community impact	Construction Manager	During Works

Notes:

1. AQMP to maintain stakeholder engagement under the protocols established under the project Community Consultation Strategy as required under Condition C13 of SSD 10437.

2. This task is to be completed as per the requirements of the project Construction Environmental Management Plan (JHG, 2022) as required under Condition C19 of SSD 10437.

These controls have been defined in a set of air quality management procedures which are provided in **Appendix B**.

6. Recommendations

Based on the information and procedures detailed herein, and subject to the limitations in **Section 7**, JBS&G consider successful implementation of this AQMP will assist to mitigate the risk to site workers and users of surrounding areas from air emissions resulting from the proposed demolition works. JBS&G recommend that to successfully manage and/or monitor air quality impacts and emissions during redevelopment activities the following approach should be adopted:

- the following management and control measures provided in **Appendix B** should be implemented for the full duration of the demolition program:
  - AQMP01: Dust, Odour, VOC and SVOC Hazard Control;
  - AQMP02: Air Quality Monitoring;
  - AQMP03: Reactive Management Procedure;
  - AQMP04: AQMP Incident Reporting;
  - AQMP05: AQMP Review;
  - AQMP06: Training;
  - AQMP07: AQMP Communication Strategy; and
  - AQMP08: AQMP Continuous Improvement.

7. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

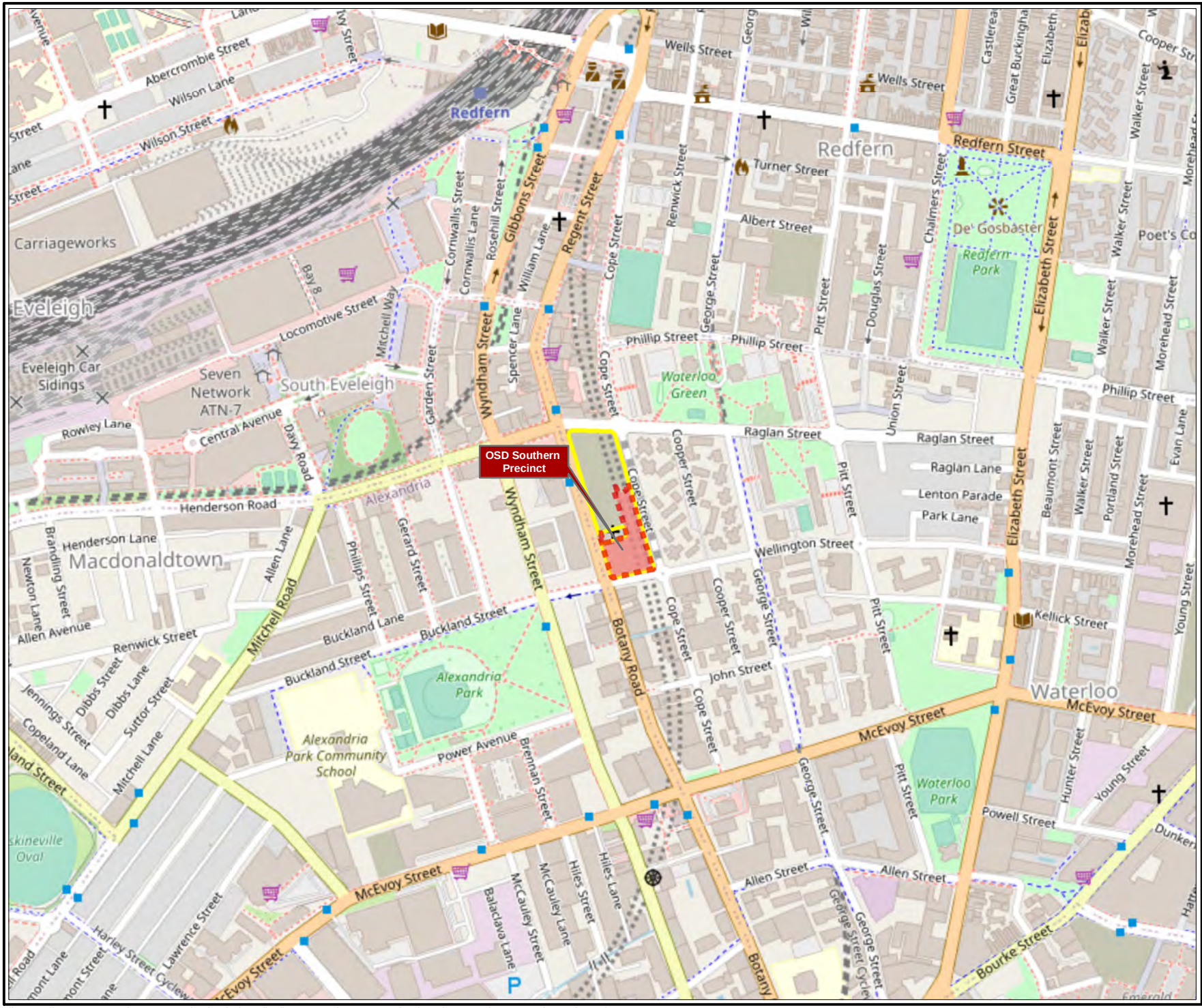
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures



Legend

- Waterloo OSD - Southern Precinct Extent
- Waterloo Metro Quarter Development Extent

JBS&G

Job No: 64061	
Client: John Holland	
Version: R01 Rev A	Date 3/02/2023
Drawn By: RF	Checked By: SD
Scale 1:7,500	

0 90 180
metres

Coord. Sys. GDA 1994 MGA Zone 56

Waterloo OSD
Southern Precinct

49 Botany Road,
Waterloo, NSW

SITE LOCATION

FIGURE 1

File Name: \\JBSG-NSW-FS01\Company Data\Projects\John Holland\64061 Waterloo OSD AQMP\GIS\Maps\R01 Rev A\61358_01_SiteLocation.mxd
Reference: Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA

Legend

- Waterloo OSD - Southern Precinct Extent
- Waterloo Metro Quarter Development Extent
- NSW Cadastre (2022)

JBS&G

Job No: 64061	
Client: John Holland	
Version: R01 Rev A	Date 3/02/2023
Drawn By: RF/AB	Checked By: SD
Scale 1:1,500	

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metres

Coord. Sys. GDA 1994 MGA Zone 56

Waterloo Metro Quarter Development

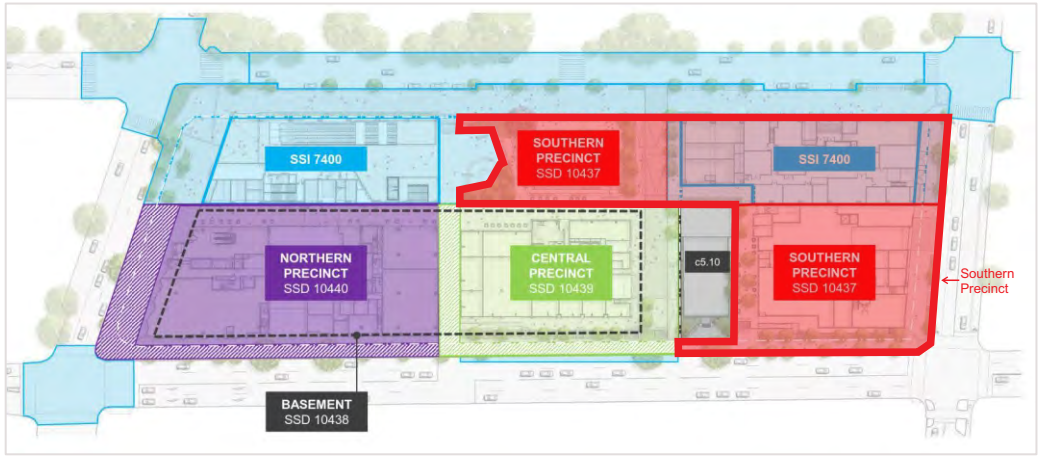
49 Botany Road, Waterloo, NSW

SITE LAYOUT

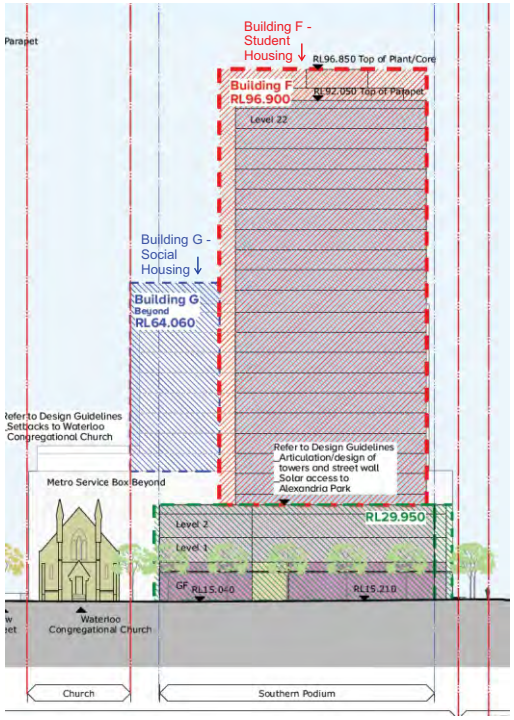
FIGURE 2

File Name: N:\Projects\John Holland\64061 Waterloo OSD AQMP\GIS\Maps\R01 Rev A\61358_02_SiteLayout.mxd
Reference: www.nearmap.com - Imagery 20210410

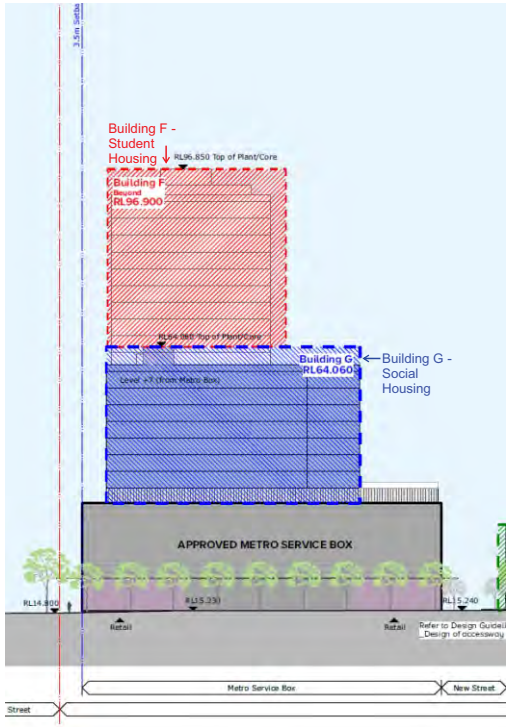
Waterloo Metro Quarter station site precinct identification (SSDA Boundaries)



Approved concept SSDA building envelope – Southern Precinct



Botany Road Elevation



Cope Street Elevation

Legend

JBS&G

Job No: 64061

Client: John Holland

Version: R01 Rev A | Date 2/12/2022

Drawn By: RF | Checked By: SD

Scale 1:1,500

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metres

Coord. Sys. GDA 1994 MGA Zone 56

Waterloo Metro Quarter Development

49 Botany Road, Waterloo, NSW

PROPOSED REDEVELOPMENT

FIGURE 3

File Name: N:\Projects\John Holland\64061 Waterloo OSD AQMP\GIS\Maps\R01 Rev A\61358_04_SensitiveReceptors.mxd
Reference: SSDA Boundaries - Source Turner

Legend

- Waterloo OSD - Southern Precinct Extent
- Waterloo Metro Quarter Development Extent
- NSW Cadastre (2022)
- Sensitive Receptors

JBS&G

Job No: 64061	
Client: John Holland	
Version: R01 Rev A	Date 3/02/2023
Drawn By: RF/AB	Checked By: SD
Scale 1:1,500	

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Coord. Sys. GDA 1994 MGA Zone 56

Waterloo Metro Quarter Development

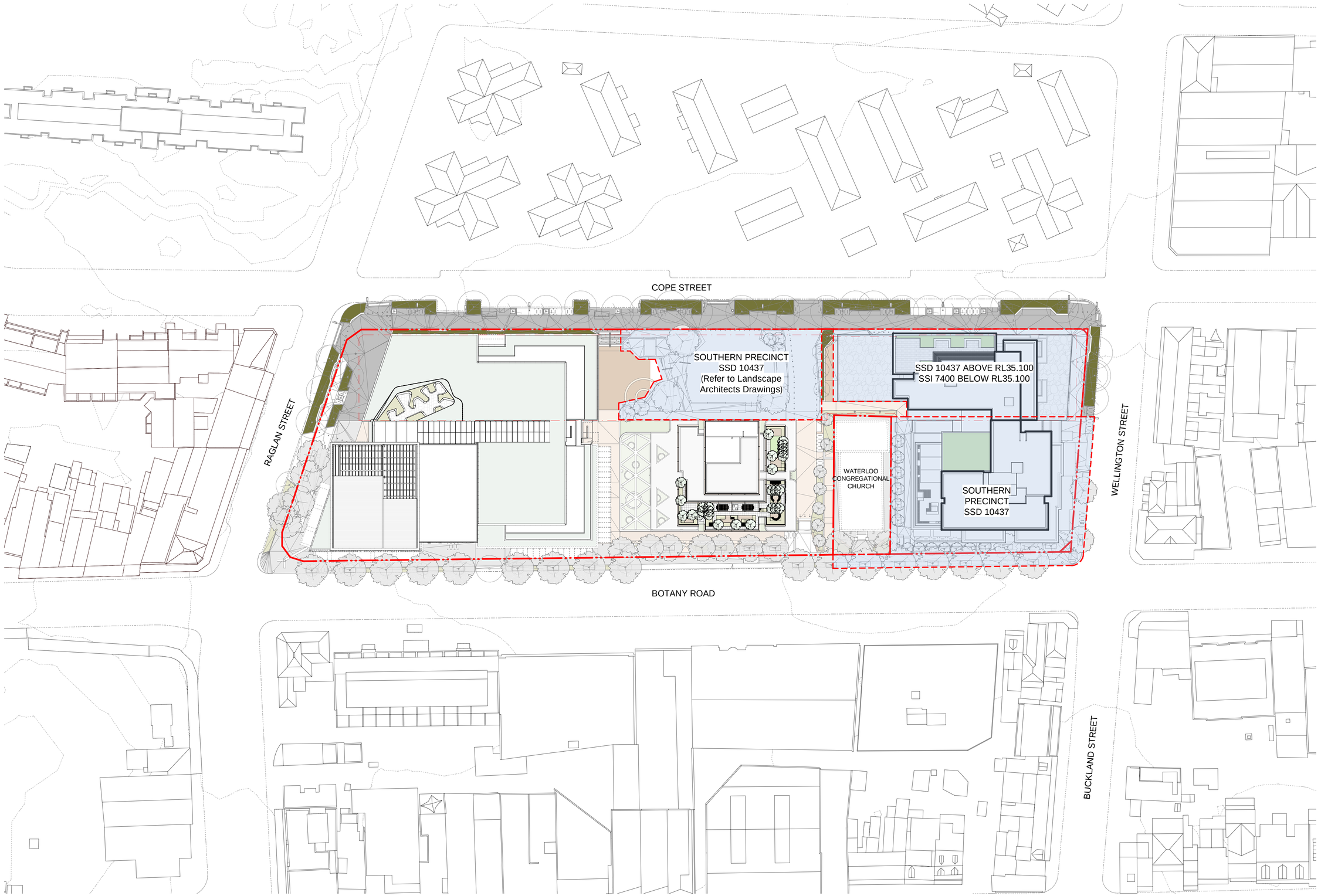
49 Botany Road, Waterloo, NSW

SENSITIVE RECEPTORS

FIGURE 4

File Name: \\JBSG-NSW-FS01\Company Data\Projects\John Holland\64061 Waterloo OSD AQMP\GIS\Maps\R01 Rev A\61358_04_SensitiveReceptors.mxd
Reference: www.nearmap.com - Imagery 20210410

Appendix A Design Plans



PRELIMINARY

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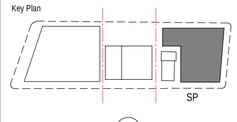
Recent revision history

#	Status	Description	Date
A		DRAFT SSDA ISSUE	15.06.20
B		SSDA ISSUE - FOR LANDOWNER'S CONSENT	30.07.20
C		SSDA ISSUE	26.08.20

Key Plan



North Point

Client

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac

NSW GOVERNMENT
sydney METRO

Consultant

BATESSMART

Project
WATERLOO METRO QUARTER DEVELOPMENT

Project number
S12398

Size check
25mm

Checked
JC

Approved
JC

Sheet size
A1

Scale
1 : 500

Sheet title

Location Plan

Status

Sheet number
WMQ-BLD3-BSA-AR-DRG-DA002

Revision
C

COPE STREET

COPE STREET PLAZA

STATION BOX BELOW

APPROVED BUILDING 4 ENVELOPE SSD 9393

0m setback to Envelope

BUILDING 4

APPROVED BUILDING 3 TOWER ENVELOPE SSD 9393

BUILDING 2

WATERLOO CONGREGATIONAL CHURCH

CHURCH YARD

BUILDING 3

APPROVED BUILDING 3 PODIUM ENVELOPE SSD 9393

WELLINGTON STREET

BOTANY ROAD

280

280

1910

5270

4360

5210

7870

5570

14110

3500

6470

3560

5770

6650

6650

3570

6650

2870

2500

PRELIMINARY

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Recent revision history

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B		SSDA ISSUE - FOR LANDOWNER'S CONSENT	30.07.20
C		SSDA ISSUE	26.08.20

Key Plan

SP

North Point

Client

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac

NSW GOVERNMENT
sydney METRO

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BATESSMART

Project

WATERLOO METRO QUARTER DEVELOPMENT

Project number
S12398

Size check
25mm

Checked
JC

Approved
JC

Sheet size
A1

Scale
1 : 200

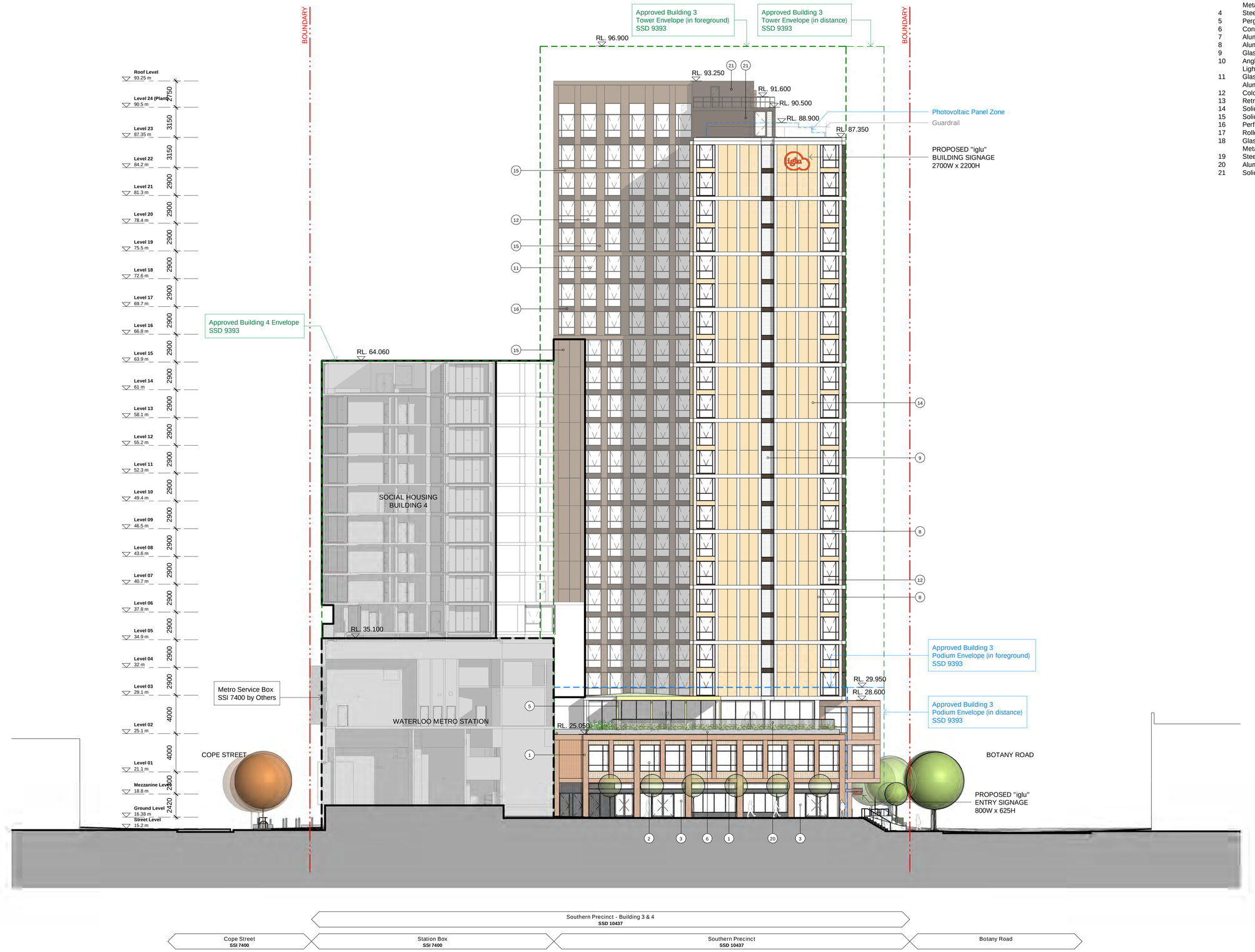
Sheet title

Site Plan

Status

Sheet number
WMQ-BLD3-BSA-AR-DRG-DA003

Revision
C



Material/ Finishes Legend

1	Brick - Red/Brown
2	Glass - Clear Aluminium frame - Charcoal
3	Glass - Clear Metal frame shopfront - Charcoal
4	Steel frame awning - Charcoal
5	Pergola
6	Concrete planter box
7	Aluminium louvres - Charcoal
8	Aluminium - Light Grey
9	Glass Louvre
10	Angled perforated aluminium sunshade - Light Bronze
11	Glass - Clear Aluminium frame - Dark Bronze
12	Colourback glass
13	Retractable awning
14	Solid aluminium cladding - Light Bronze
15	Solid aluminium cladding - Medium Bronze
16	Perforated aluminium - Dark Bronze
17	Rollershutter - Charcoal
18	Glass - Clear Metal frame shopfront - Dark Bronze
19	Steel frame awning - Dark Bronze
20	Aluminium palisade balustrade - Charcoal
21	Solid aluminium cladding - Dark Bronze

Recent revision history

#	Status	Description	Date
A		ISSUE FOR INFORMATION	01.06.20
B		DRAFT SSDA ISSUE	15.06.20
C		SSDA ISSUE - FOR LANDOWNER'S CONSENT	29.07.20
D		SSDA ISSUE - FOR LANDOWNER'S CONSENT	30.07.20
E		SSDA ISSUE	26.08.20
F		SSDA ISSUE	31.08.20

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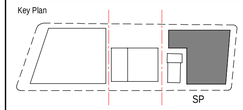

North Point

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JOHN HOLLAND
mirvac

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sydney METRO

Consultant

BATESSMART

Project

WATERLOO METRO QUARTER DEVELOPMENT

Project number S12398

Size check 25mm

Checked JC

Approved JC

Sheet size A1

Scale 1 : 200

Sheet title

Elevation - North

Status

Sheet number WMQ-BLD3-BSA-AR-DRG-DA140

Revision F

PRELIMINARY

Recent revision history

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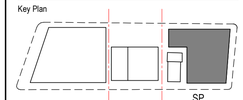
I		SSDA ISSUE	26.08.20
J		RTS draft	08.02.21
K		RTS	10.02.21
L		RTS	15.02.21
M		RTS	26.03.21
N		S4.55 MOD 1	05.04.22

Modification Changes

- Student Bulky Waste reconfiguration
- Switch room change
- Student Accommodation - reconfiguration to the core and services
- Gym - lift and stair reconfiguration
- Addition of block wall and boom gate to loading dock driveway
- B99 Space reconfiguration

Key Plan



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Project
WATERLOO METRO QUARTER DEVELOPMENT

Project number
WMQ-BLD3-BSA

Size check
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Checked
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Approved
JC

Sheet size
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Scale
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Sheet title
General Arrangement Plan
Ground Floor Plan

Status
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Sheet number
WMQ-BLD3-BSA-AR-DRG-DA100

Revision
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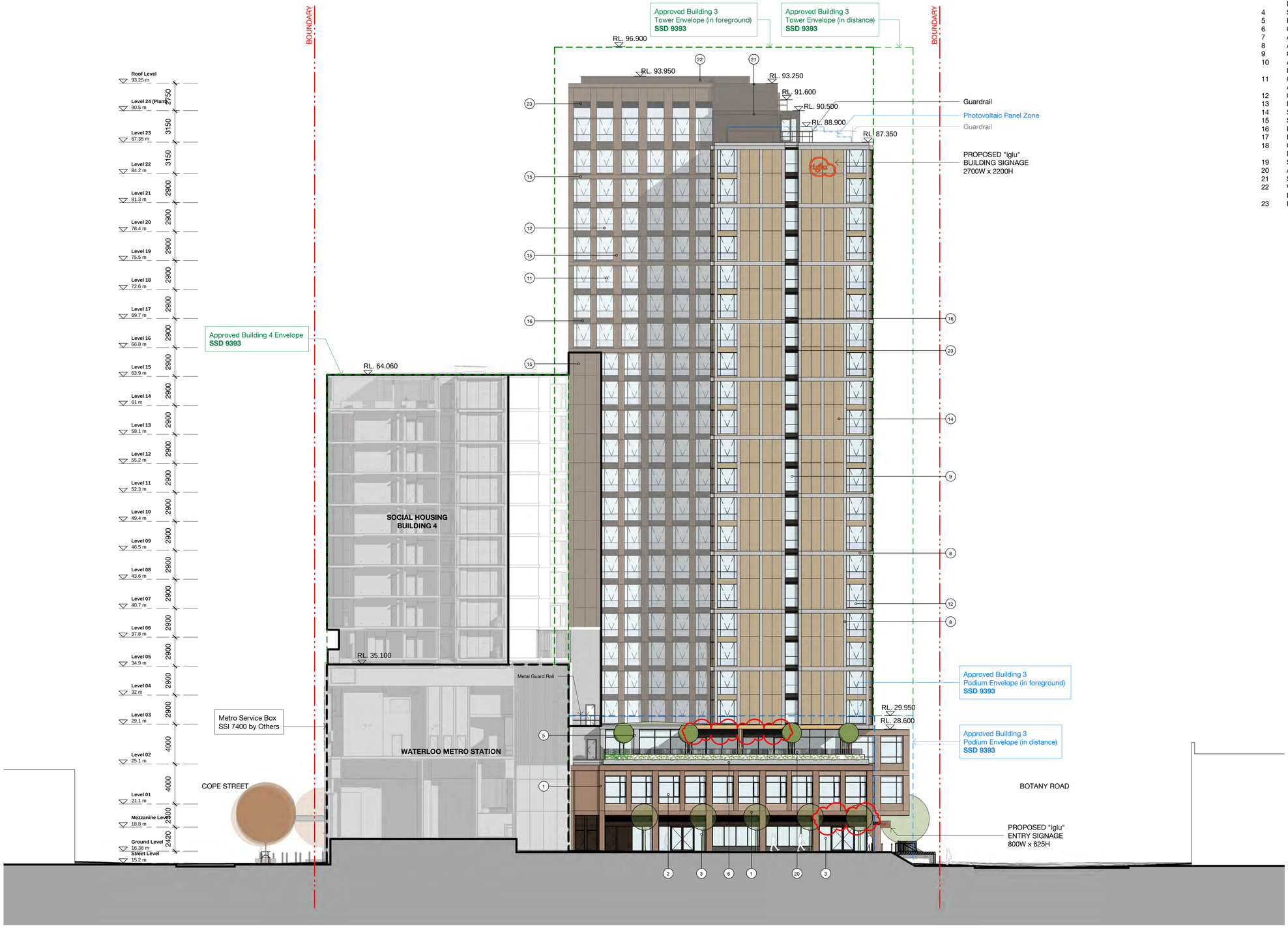

Material/ Finishes Legend

1	Brick - Red/Brown
2	Glass - Clear Aluminium frame - Charcoal
3	Glass - Clear Metal frame shopfront - Charcoal
4	Steel frame awning - Charcoal
5	Pergola
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15	Solid aluminium cladding - Medium Bronze
16	Perforated aluminium - Dark Bronze
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19	Steel frame awning - Dark Bronze
20	Aluminium palisade balustrade - Charcoal
21	Solid aluminium cladding - Dark Bronze
22	Vertical aluminium louvre screen - Dark Bronze
23	Horizontal aluminium louvre - Dark Bronze

Recent revision history

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B		DRAFT SSDA ISSUE	15.06.20
C		SSDA ISSUE - FOR LANDOWNER'S CONSENT	29.07.20
D		SSDA ISSUE - FOR LANDOWNER'S CONSENT	30.07.20
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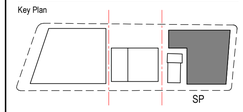
G		RTS draft	08.02.21
H		RTS	10.02.21
I		RTS	15.02.21
J		RTS	26.03.21
K		S4.55 MOD 1	05.04.22

Modification Changes

- Addition of louvres to the ground level and level 2

Key Plan



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JOHN HOLLAND
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BATESSMART

Project
WATERLOO METRO QUARTER DEVELOPMENT

Project number
WMQ-BLD3-BSA

Size check
25mm

Checked
JC

Approved
JC

Sheet size
A1

Scale
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Elevation - North

Status
AFT D&C Builder

Sheet number
WMQ-BLD3-BSA-AR-DRG-DA140

Revision
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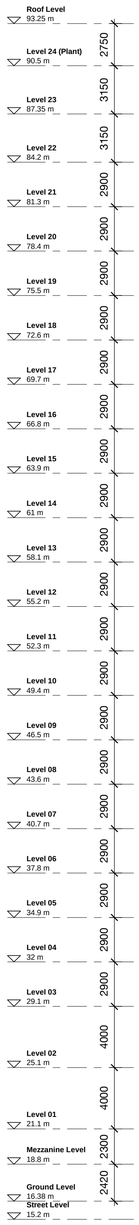

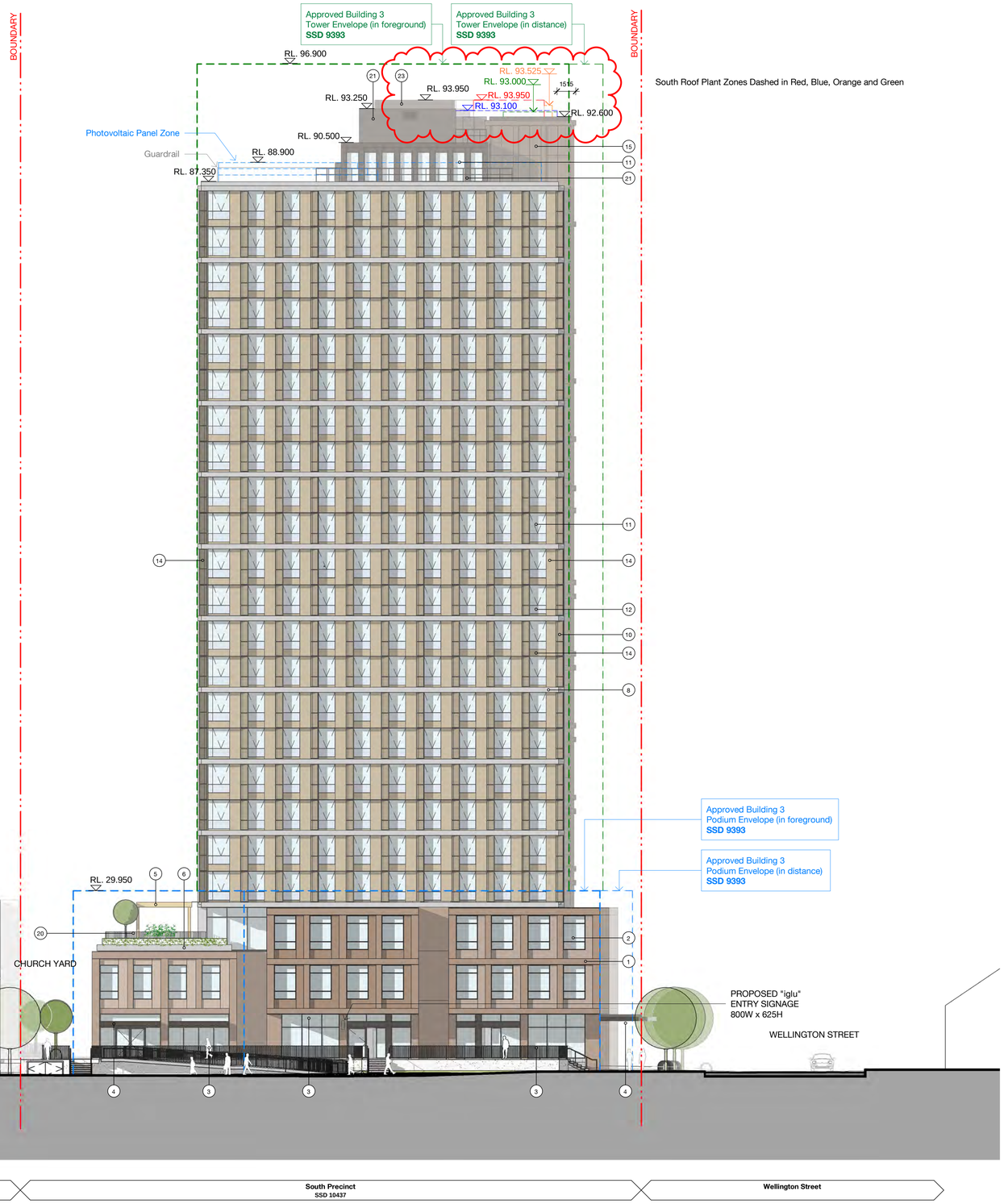

South Roof Plant Zones Dashed in Red, Blue, Orange and Green

Material/ Finishes Legend

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2	Glass - Clear Aluminium frame - Charcoal
3	Glass - Clear Metal frame shopfront - Charcoal
4	Steel frame awning - Charcoal
5	Pergola
6	Concrete planter box
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23	Horizontal aluminium louvre - Dark Bronze

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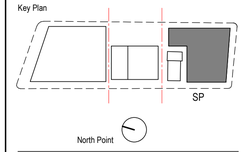
I		RTS	15.02.21
J		RTS	26.03.21
K		S4.55 MOD 1	05.04.22
L		S4.55 MOD 1	01.06.22

Modification Changes

- Roof plant zone
- Addition of louvre to level 24 lift core

Key Plan



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A Joint Venture Project
JOHN HOLLAND
mirvac

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sydney METRO

Consultant

BATESSMART

Project

WATERLOO METRO QUARTER DEVELOPMENT

Project number	Size check		
WMQ-BLD3-BSA	25mm		
Checked	Approved	Sheet size	Scale
RT	RT	A1	1 : 200

Sheet title

Elevation - West

Status

AFT D&C Builder

Sheet number

WMQ-BLD3-BSA-AR-DRG-DA141

Revision

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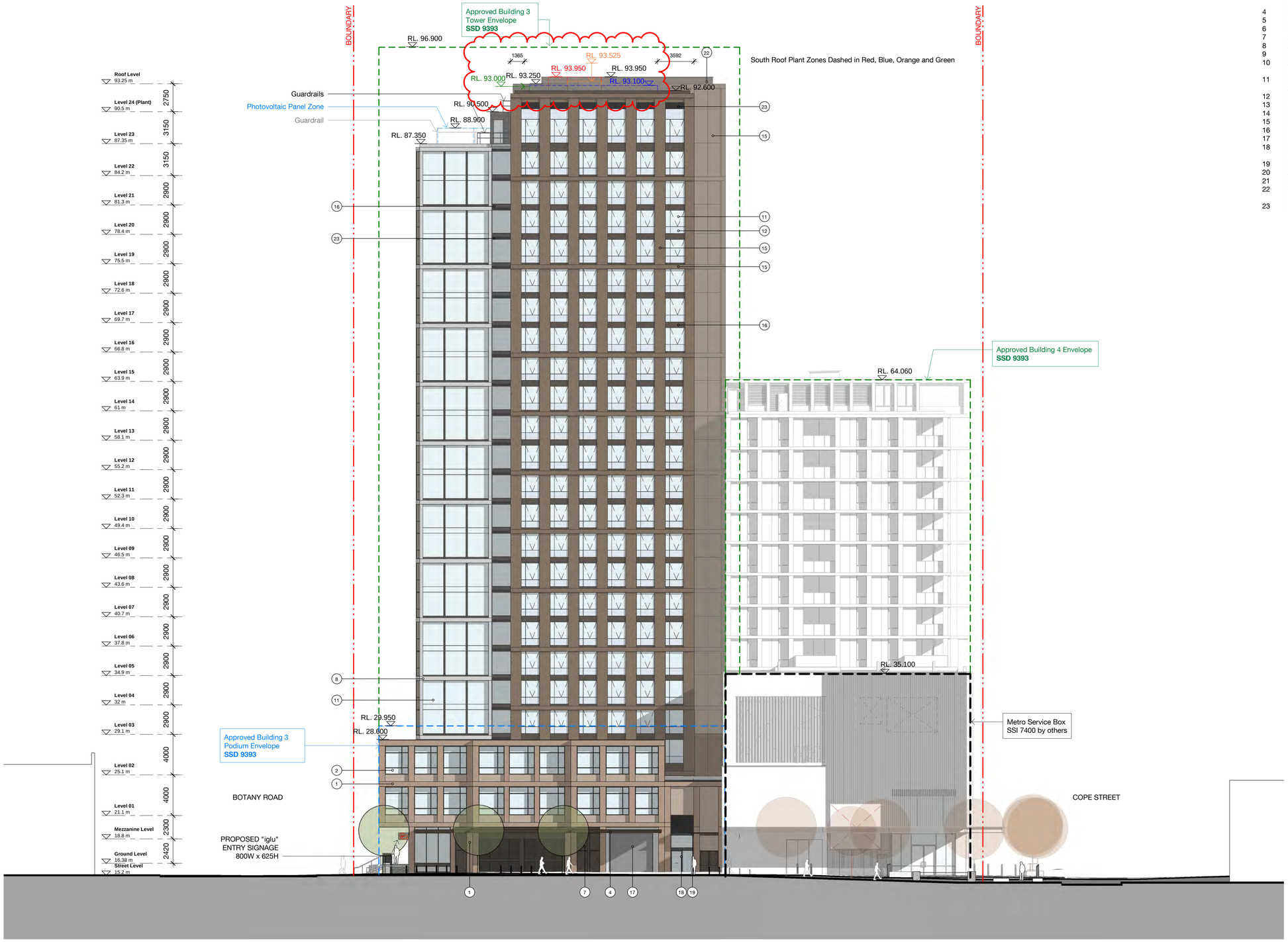

Southern Precinct - Building 3 & 4
SSD 10437

Botany Road	Southern Precinct SSD 10437	Station Box SSI 7400	Cope Street SSI 7400

Material/ Finishes Legend

1	Brick - Red/Brown
2	Glass - Clear Aluminium frame - Charcoal
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Recent revision history

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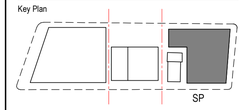
J		RTS	26.03.21
K		S4.55 MOD 1	05.04.22
L		S4.55 MOD 1	01.06.22

Modification Changes

- Roof plant zone

Key Plan



North Point

Client

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac

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sydney METRO

Consultant

BATESSMART

Project

WATERLOO METRO QUARTER DEVELOPMENT

Project number
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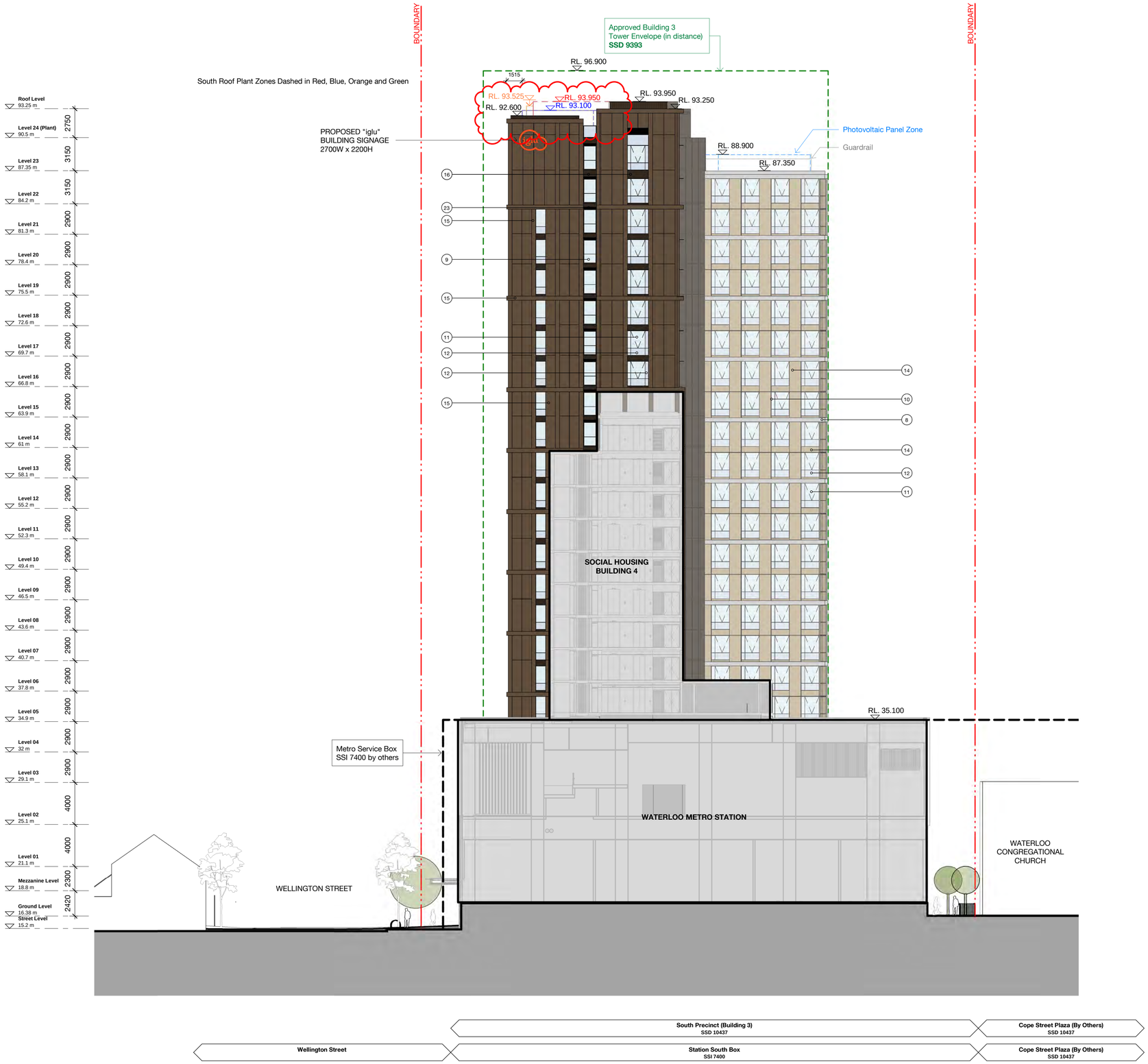

Material/ Finishes Legend

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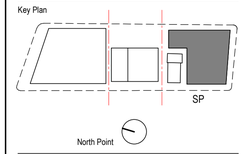
J		RTS	26.03.21
K		S4.55 MOD 1	05.04.22
L		S4.55 MOD 1	01.06.22

Modification Changes

- Roof plant zone

Key Plan



Client

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac

NSW GOVERNMENT
sydney METRO

Consultant

BATESSMART

Project

WATERLOO METRO QUARTER DEVELOPMENT

Project number
WMQ-BLD3-BSA

Size check
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Approved
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Sheet title

Elevation - East

Status
AFT D&C Builder

Sheet number
WMQ-BLD3-BSA-AR-DRG-DA143

Revision
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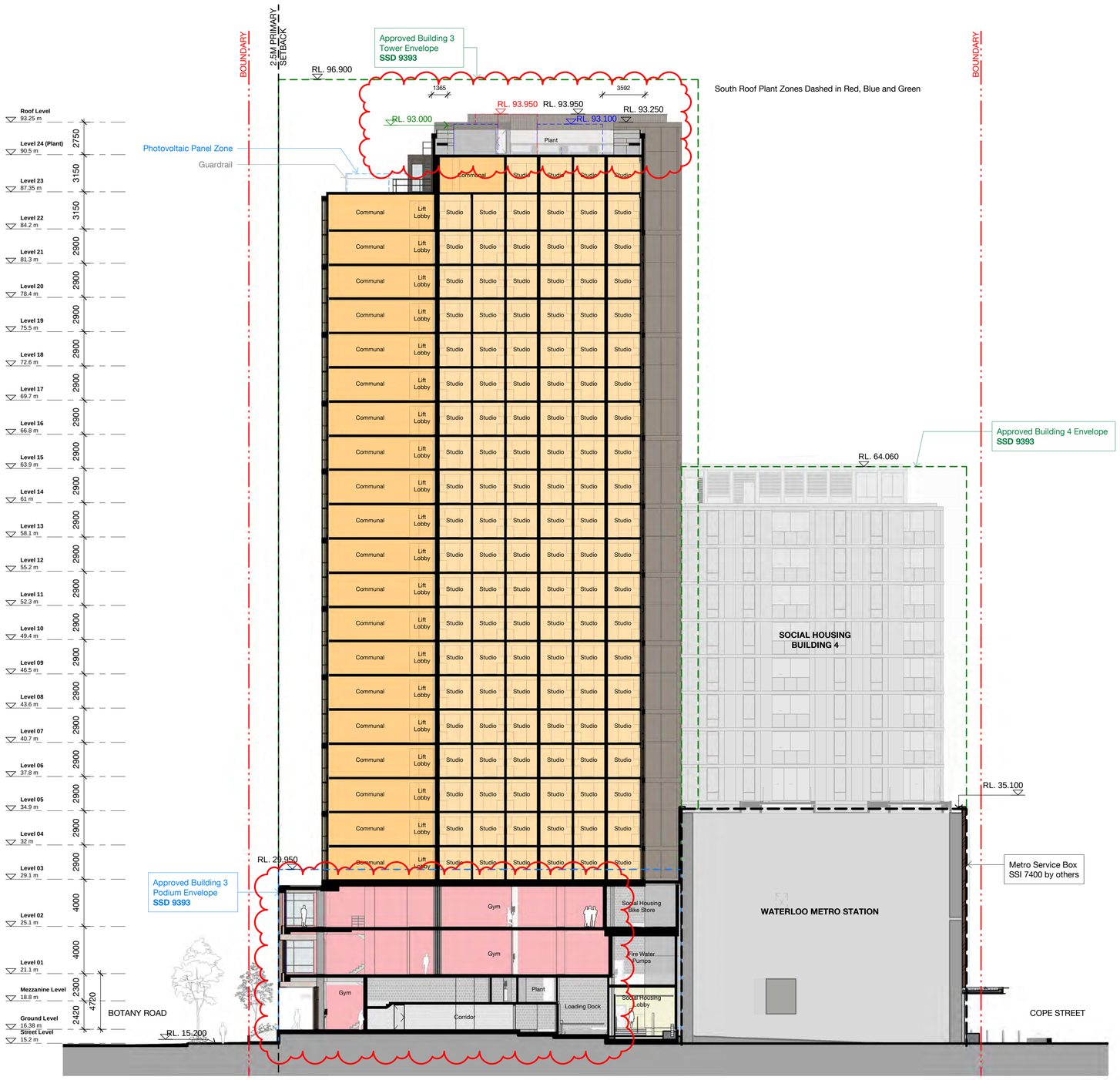


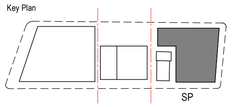
Recent revision history

#	Status	Description	Date
C		ISSUE FOR INFORMATION	01.06.20
D		DRAFT SSDA ISSUE	15.06.20
E		SSDA ISSUE - FOR LANDOWNER'S CONSENT	29.07.20
F		SSDA ISSUE - FOR LANDOWNER'S CONSENT	30.07.20
G		SSDA ISSUE	26.08.20
H		RTS draft	08.02.21
I		RTS	10.02.21
J		RTS	15.02.21
K		RTS	26.03.21
L		S4.55 MOD 1	05.04.22

Modification Changes

- Roof plant zone
- Gym – lift and stair reconfiguration
- Addition of block wall and boom gate to loading dock driveway

Key Plan



North Point

Client

Waterloo Integrated Station Development
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WATERLOO METRO QUARTER DEVELOPMENT

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Section E-W

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Sheet number
WMQ-BLD3-BSA-AR-DRG-DA150

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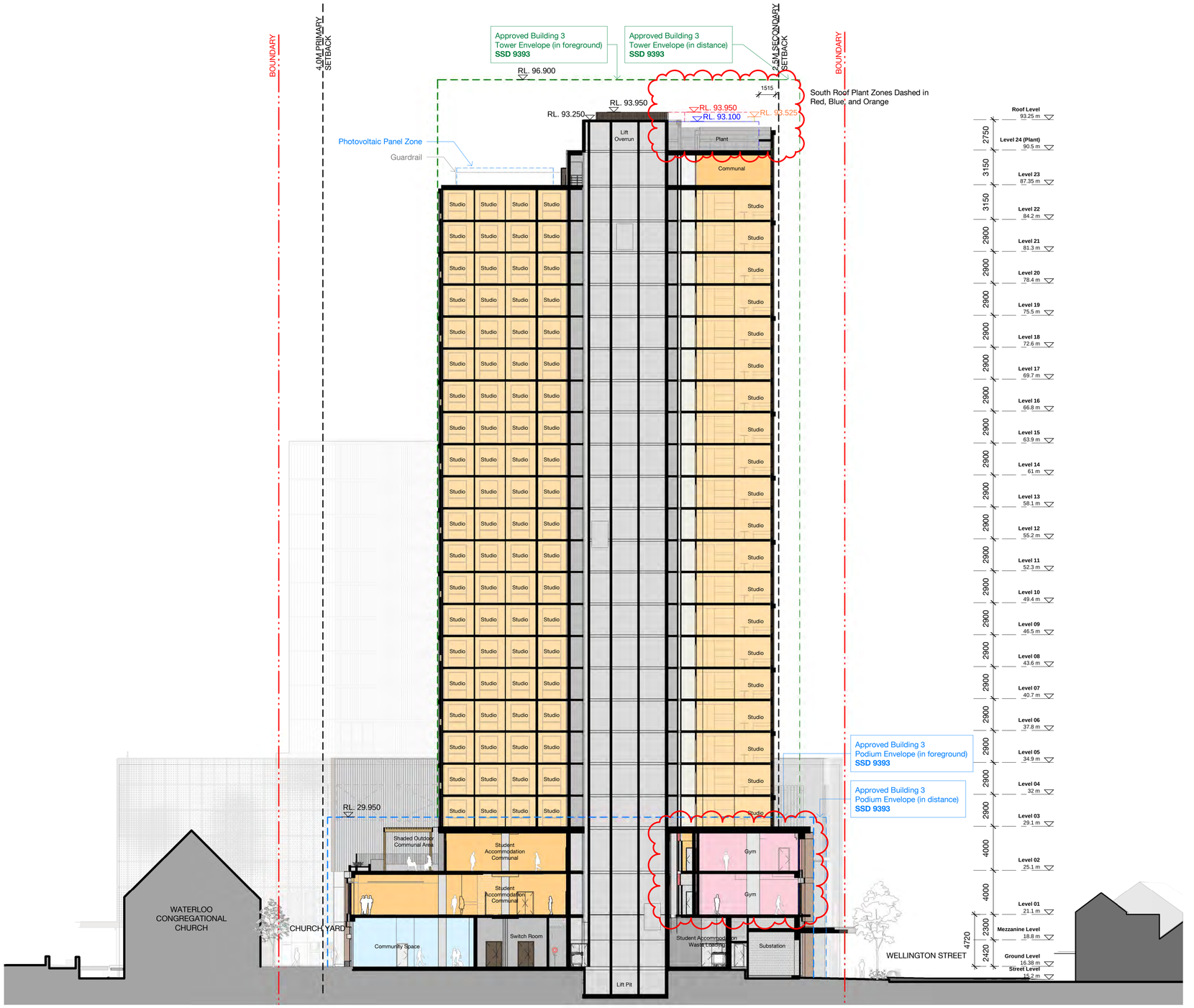

Recent revision history

#	Status	Description	Date
C		ISSUE FOR INFORMATION	15.05.20
D		ISSUE FOR INFORMATION	01.06.20
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M		S4.55 MOD 1	01.06.22

Modification Changes

- Roof plant zone
- Gym - lift and stair reconfiguration

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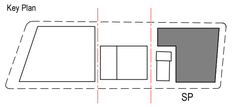

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Project number
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Sheet title

Section N-S

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Sheet number
WMQ-BLD3-BSA-AR-DRG-DA151

Revision
M

Appendix B Air Quality Management Procedures

Dust, Odour, VOC and SVOC Hazards Control	AQMP01
Responsibility:	John Holland
Frequency:	All site works
Location:	Site
Objective:	To minimise dust, odour, VOC and SVOC emissions from demolition and construction

Procedure

Dust, Odour, VOC and SVOC Risk

The proposed demolition and construction works will have the potential to generate dust emissions and to a much lesser extent, odour, VOC and SVOC emissions. This is based on the findings of the remedial action plan (RAP, JBS&G 2023) for the site which confirmed there are no previously identified impacts that require management and / or remediation. It is understood that only minor excavations are required in this portion during future construction works (to facilitate the installation of services etc). As such, subject to the implementation of the unexpected finds protocol (UFP) presented in the RAP during site development works, it is considered that standard dust controls will be sufficient to prevent the unlikely occurrence of unacceptable emissions to air of odour, VOC and SVOC. These controls as discussed below will be required.

Standards

All operations on site are to be conducted so that concentrations of airborne dust and other hazardous substances satisfy those stipulated in NSW EPA published and endorsed guidelines. These guidelines include:

- NEPC (1998) 'National Environment Protection Measure for Ambient Air Quality' and
- Environmental criteria and monitoring requirements provided in NSW EPA (January 2017) '*Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*' for parameters relating to dust i.e. PM_{10} and deposited dust.

Additionally, it will be required that visible dust emissions from the works are not observable leaving the boundary of the worksite (refer **AQMP02 Air Quality Monitoring**).

Control

Measures shall be undertaken to reduce airborne emissions from site activities including:

- The Work Health & Safety (WHS) plan (or similar) for the project should be referred to for the full list of PPE and decontamination requirements for the demolition and construction workforce.
- Water sprays used for dust suppression shall be used in the location of dust generating areas as a minimum should the results of realtime dust monitoring (as per **AQMP02 Air Quality Monitoring**) exceed the acceptable level. This may include pre-wetting of proposed demolition areas each day in addition to wetting during demolition;
- A water misting system will be established on site boundaries for use as required to prevent off-site emissions as a minimum should the results of realtime dust monitoring (as per **AQMP02 Air Quality Monitoring**) exceed the acceptable level;
- Stockpile heights shall be minimised where possible;
- Where stockpiles are to be left in place for significant periods of time, they shall be covered o routinely wetted to prevent dust emissions; and
- Where unfavourable meteorological conditions exist (i.e. strong winds directed west or south) site works shall be restricted to those with low potential for atmospheric emissions. This shall also include consideration of reduced production rates during these periods to minimise dust emissions.
- Spraying formations and exposed work areas to suppress dust using water carts and other suitable equipment
- Minimise traffic on exposed areas – create designated haul roads
- When using machinery to handle dusty/dust-generating materials, minimise the distance between where the material is stored and its final location
- Water would be sprayed on unsealed access roads and open areas during conditions conducive to dust generation

- On-site vehicle speed limits would be established and enforced to prevent dust emissions
- Stockpiled material should be appropriately managed and shaped to reduce wind erosion and covered as appropriate
- During extreme weather events where dust generation cannot be effectively minimised (such as high winds), dust generating works would cease until adequate controls can be implemented or until adverse weather conditions subside
- Remove mud from haul vehicles prior to entering public roads. A wheel cleaning/washing system may be established for vehicles entering/leaving sit
- Reprogram dust generating work during periods of high wind
- Provide awareness training in the need to minimise dust during site inductions and toolbox talks
- Regular visual monitoring of dust generation
- Plant and equipment will be serviced and maintained in good working order to reduce unnecessary emissions from exhaust fumes. Maintenance of Plant & Equipment as per manufacturers requirements
- Plant, machinery and vehicles would be turned off while not in use, where safe to do so
- Construction plant, machinery or vehicles producing excessive visual exhaust would be turned off, tagged 'out of order' and not used
- All emission controls used on vehicle and equipment would comply with standards listed in Schedule 4 of the Protection of the Environment Operations (Clean Air) Regulation 2010
- In the event that odour emissions are generated beyond the site boundaries then, work should cease until the source and nature of the odour can be determined and an appropriate course of action carried out. This may include further assessment to determine potential impacts on the nearest sensitive receptors.
- If air quality complaints occur as a result of works, works would cease and dust/odour generating activities should be re-assessed to reduce community impact.
- Regular maintenance shall be undertaken of sprinkler heads, as used for dust control throughout the site, to prevent clogging.

Air Quality Monitoring	AQMP02
Responsibility:	John Holland
Frequency:	Duration of Demolition and Construction Works
Location:	Site boundaries
Objective:	To assess compliance with environmental standards for works

Procedure

A program of atmospheric monitoring shall be undertaken at site for the duration of construction works. The extent of required monitoring is summarised in the following table and described below.

Pollutant	Monitored as	Averaging Period	Undertaken	Action
Dust	Realtime PM_{10} measurements	30 seconds	Hourly for 1st two weeks of work in both building areas and plaza	Trigger Value: 50µg/m^3 Any exceedance triggers **AQMP03** Reactive Management Procedure If trigger value is not exceeded during first two weeks (in both building areas and the plaza) and dust controls are being adopted then monitoring can be reduced to a daily visual confirmation (as per JHG air quality and dust management procedure SMCSWSWL_JHG_SWL_EM_PRO_00005).
	Dust gauge depositions	1 hour	Monthly gauges for the 1st 12 months of work	Trigger Value: 2g/m^2/month Any exceedance triggers **AQMP03** Reactive Management Procedure Monthly dust gauge use for the first 12 months of construction. Dust gauge monitoring can be terminated after the first 12 months of works provided the monthly results have not exceeded the trigger value.
Odours, VOCs and SVOCs	PID	30 seconds	Hourly for 1st two weeks of work in both building areas and plaza	Trigger Value: 1.6 ppm Any exceedance triggers **AQMP03** Reactive Management Procedure If trigger value is not exceeded during first two weeks (in both building areas and the plaza) and dust controls are being adopted then monitoring can be reduced to a daily visual confirmation (as per JHG air quality and dust management procedure SMCSWSWL_JHG_SWL_EM_PRO_00005).

Further details for each of the air quality monitoring requirements are provided below.

Dusts – Realtime Particulate Monitoring

Assessment of realtime levels of dusts shall be undertaken by trained personnel observing site boundaries. Where visible dusts are found to be observable leaving the site boundary then actual site measurements shall be undertaken by a 'DustTrak' Aerosol Monitor. The averaged level of PM_{10} (particulate matter less than 10 microns in diameter) over a period of 30 seconds shall be required to be less than 50µg/m^3 at the downwind portion of the site boundary.

Where the acceptable level of dust is exceeded by real-time aerosol monitoring, then dust control measures as advised in **AQMP01** Dust and Airborne Hazard Control shall be implemented.

Dusts – Deposition Monitoring

Dust deposition monitoring shall be undertaken by dust deposition gauges maintained permanently at four locations on the site boundary (one north, one south, one east and one west). These locations have been determined on the basis of

siting requirements in *AS2922-1997 'Ambient Air – Guide for Siting of Sampling Units'* to the extent possible. Collection and analysis of samples shall be undertaken in accordance with *AS3580.10.1-2003 'Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method'*. Samples shall be collected and analysed monthly throughout the works.

Where the level of dust deposition exceeds 2g/m^2/month the implementation of **AQMP01** Dust and Airborne Hazard Control shall be reviewed.

Volatile Organic Compounds (VOCs) – Photo-Ionisation Detector(for Odours, VOCs and SVOC Monitoring)

Assessment for VOCs shall be undertaken using a photo-ionisation detector (PID) provided with a 10.6eV bulb. Prior to use and at least on a daily basis the calibration of the PID shall be checked by comparison to a fresh air and isobutylene standard. The calibration check shall be recorded as per the appropriate PID calibration forms.

VOC monitoring shall be undertaken at all times in the proximity of handling of malodorous materials. Contaminants identified on the project site which have potentially significant health impacts are considered to occur within malodorous materials. The identification of malodorous materials is an appropriate measure for the potential presence of significant levels of VOCs.

The PID shall be maintained by an attended operator within a distance of approximately 2m during all periods of handling malodorous materials. Where the operator is unable to safely remain within 2m of the works area (consequent of heavy equipment or otherwise) the PID may be affixed to an excavator or similar in proximity of the works. PID measurements shall be undertaken as one hour averages.

The action level to assess PID readings will be set at 1.6 ppm as based on 10% of the OH&S-based Benzene time-weighted average. Once sufficient daily VOC monitoring data has been collected the trigger level will be modified if needed. This initial trigger value is considered appropriate given that sensitive receptors are located within 50m of the site boundaries.

Diesel

Under the proposed development scenario, it is anticipated plant/equipment utilised at the site will meet the minimum emissions standards outlined by the NSW EPA (required for registration), and standard construction requirements (i.e. documentation of plant maintenance and service history checklists etc.). As such, it is not anticipated that active monitoring for diesel particulate is required as part of site development activities.

Notwithstanding, if identified as being required, diesel particulate monitoring can be conducted to assess potential exposure risks to site workers and/or offsite receptors as outlined by the Australian Institute of Occupational Hygienists.

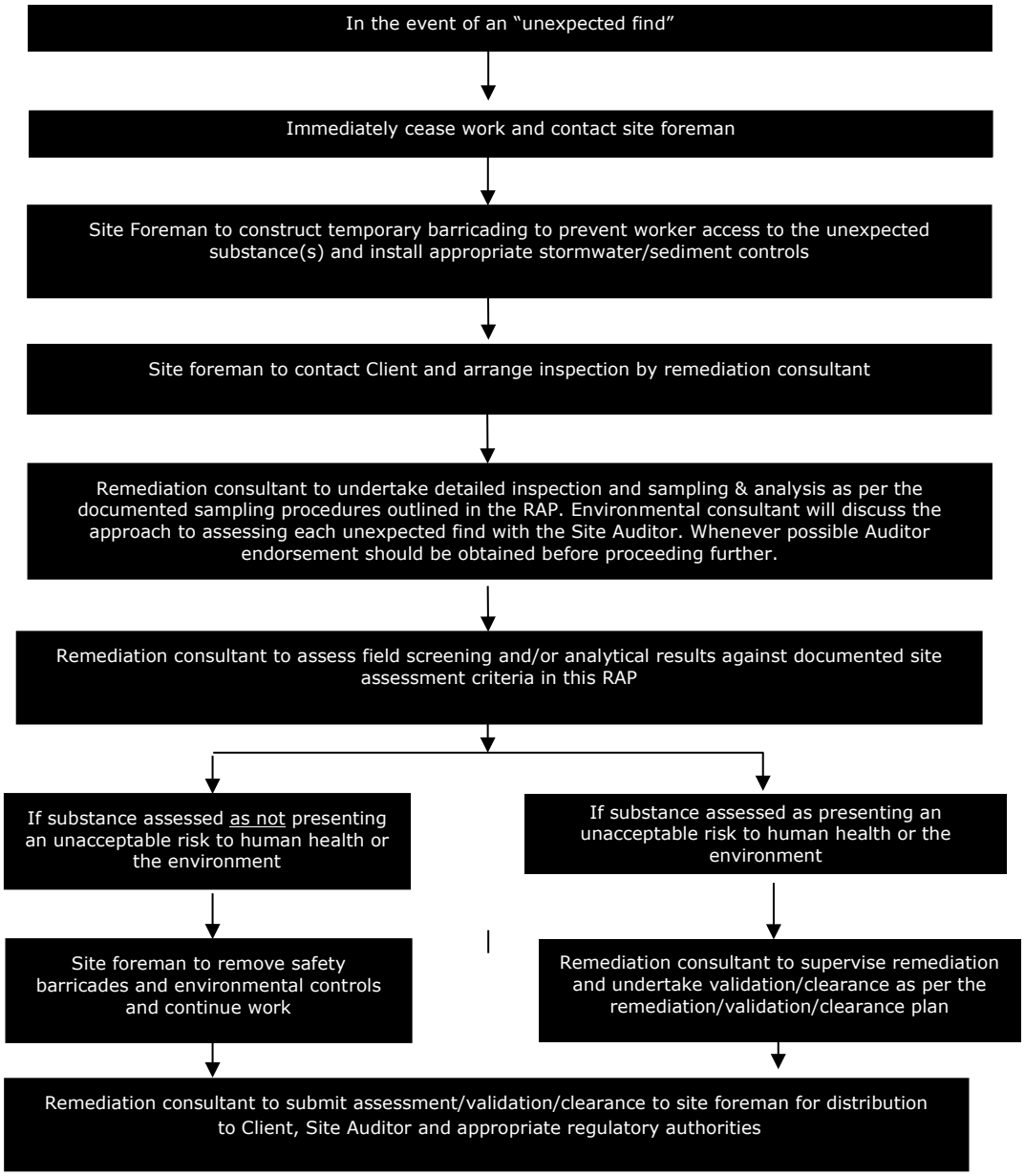
Reactive Management Procedure	AQMP03
Responsibility:	John Holland
Frequency:	Duration of Demolition and Construction Works
Location:	Site boundaries
Objective:	To assess compliance with environmental standards for works

The consent conditions C23 to C25 required that the AQMP include a reactive management procedure in the event that potential dust (as PM10) or odour emissions exceed the trigger values and a range of measures to minimise these.

Procedure

The reactive management procedure to be adopted will be the unexpected finds protocol (UFP) as provided for the site in the RAP (JBS&G 2023) based on the staged approach shown below. The UFP has been reviewed and endorsed by the NSW EPA accredited site auditor appointed to the site.

Flowchart AQMP 3.1 – Unexpected Finds Protocol (as per RAP, JBS&G 2023)



AQMP Incident Reporting		AQMP04
Responsibility:	John Holland	
Frequency:	As required in response to incidents and/or trigger level exceedance within the AQMP	
Objective:	To ensure the AQMP is implemented as intended.	

Procedure

JHG has prepared the '*Waterloo OSD Project, Southern Precinct, Construction Framework Environmental Management Plan*' Document ID WMQ-SITE-JHG-PM-MPL-0005 which includes a comprehensive compliance and corrective action framework which is intended to apply to all aspects of the Waterloo OSD, Southern Precinct construction works.

in the event that an air quality incident (in the form for any air quality issues or complaints that occur on the site) or as dictated by the reactive management procedure, then JHG shall facilitate the completion of a written incident notification as per the requirements of Appendix 6 of '*Waterloo OSD Project, Southern Precinct, Construction Framework Environmental Management Plan*' Document ID WMQ-SITE-JHG-PM-MPL-0005, which shall be retaining as part of the project records and be made available to the appointed certifier and the NSW Department of Planning & Environment.

AQMP Review		AQMP05
Responsibility:	John Holland	
Frequency:	Subsequent to environmental incidents. Subsequent to changes in scope of works.	
Location:	Not applicable	
Objective:	To ensure that the AQMP is current and appropriate for the site	

Procedure

Subsequent to any environmental incidents on the site and/or a significant modification to the implemented scope of works, the AQMP shall be reviewed by JBS&G. All new copies of AQMP shall be re-distributed to all relevant parties by JBS&G. The JHG Project Environmental Management Plan as prepared for the project by John Holland will require to be updated with the provisions of any revised AQMP.

Training	AQMP06
Responsibility:	John Holland
Frequency:	Throughout implementation of the Construction Noise and Vibration Management Plan (CNVMP)
Location:	-
Objective:	To ensure that persons responsible for implementation of the AQMP are competent.

Procedure

Any person who is required to be responsible for technical / monitoring activities in relation to the implementation of the AQMP shall:

- Be inducted as to the requirement and method of the specific activity by JBS&G or their nominated representative; and
- Have undertaken the 24 hour Health and Safety Training for Hazardous Waste / Materials under OSHA 29 CFR 1910:120 or equivalent.

AQMP Communication Strategy	AQMP07
Responsibility:	John Holland
Frequency:	Throughout implementation of the '*Waterloo OSD Project, Southern Precinct, Construction Framework Environmental Management Plan*' Document ID WMQ-SITE-JHG-PM-MPL-0005
Location:	-
Objective:	To develop and maintain community partnerships and relationships through managing community impacts

The consent conditions C23 to C25 require that the AQMP include a Communication Strategy. The Communication Strategy to be adopted will align with the overarching '*Waterloo Metro Quarter Community Communication Strategy: Station Construction and Over Station Development December 2022*' Document ID: CSWSWL-JHG-SWL-CL-PLN-000001, Revision 5.1. The minimum requirements of this strategy, relevant to air quality management only, are summarised below.

Procedure

Project Sector	Communication Type	Responsible Party	Frequency	Comments
Internal	Meetings	JHG Construction Manager	As required	Pre-start meeting – to identify requirements of this AQMP and the responsible parties for daily implementation and record keeping. Project Team Meetings – to review routine air quality monitoring results, discuss if results have exceeded **AQMP02** criteria and triggered **AQMP03** Reactive Management. Ensure appropriate record keeping takes place, and any changes are justified in writing
	Record keeping or written instructions	JHG Construction Manager	As required	Required weekly for initial period of high frequency air quality monitoring. Any reduction in the required monitoring frequency after the initial period is to be issued in a written instruction from the Environmental Consultant with justified based on available results. Required for any incident notification form that is triggered for air quality issue as per Appendix 6 of '*Waterloo OSD Project Basement Construction Framework Environmental Management Plan*' Document ID WMQ-BMNT-JHG-PM-MPL-0005.
External	Advice of Key Project Contacts (on site)	JHG Construction Manager	At least 5 days prior to start of works	Site signage and hoardings
	Advice of Key Project Contacts (off-site)	Stakeholder & Community Liaison team (S&CLT)	At least 5 days prior to start of works	Email updates, community notifications and newsletters
	Updates and Information about upcoming work	S&CLT	Every 6 months, and as required	Regular notifications and newsletters Doorknocks as required
	Receipt of concerns or complaints	S&CLT	As required	Operation of a 24hr community information line On-on-one meetings as required

AQMP Continuous Improvement	AQMP08
Responsibility:	John Holland
Frequency:	Throughout implementation of the '*Waterloo OSD Project, Southern Precinct, Construction Framework Environmental Management Plan*' Document ID WMQ-SITE-JHG-PM-MPL-0005
Location:	Not applicable
Objective:	To ensure that the AQMP is current and subject continual improvement whenever possible.

Procedure

Continuous improvement is built into this AQMP by the continual review of monitoring results against project air quality criteria and triggers, as provided in **AQMP02**.

Continuous improvement will also be achieved by the ongoing evaluation of environmental management performance and effectiveness of this AQMP against environmental policies, objectives and targets. Specifically this will occur by:

- The JHG Construction Manager seeking weekly confirmation from the project environmental consultant that no change has occurred in the broader environmental policies, objectives and targets that are relevant to this AQMP; and
- in the event that, over the course of the project, the relevant policies, objectives or targets change, then additional mitigations measures and or updates to the AQMP shall be implemented.