4 - 6 Bligh Street, Sydney NSW

Operational Noise & Vibration Impact Assessment

22/12/2022

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1. Introduction

This report has been prepared to accompany an SSDA for the for the mixed-use redevelopment proposal at 4-6 Bligh Street, Sydney.

The Council of the City of Sydney, as delegate for the Minister for Planning and Public Spaces (the Minister), is the Consent Authority for the SSDA under an Instrument of Delegation issued by the Minister on 3 October 2019.

The application seeks consent for the construction of a 59-storey mixed-use hotel and commercial development. The purpose of the project is to revitalise the site and deliver new commercial floorspace and public realm improvements consistent with the City's vision to strengthen the role of Central Sydney as an international tourism and commercial destination.

A separate development consent (D/2018/892) relating to early works for the proposed application was granted for the site on 31 January 2020. Consent was granted for the demolition of the existing site structures, excavation and shoring of the site for three basement levels (to a depth of RL9.38m) to accommodate the proposed mixed-use hotel and commercial development. As such, this application does not seek consent for these components and instead seeks to rely upon and activate D/2018/892 for early works.

Specifically, development consent is sought for:

- Site establishment, including removal of three existing trees along the Bligh Street frontage and de- commissioning and removal of an existing substation (s2041) on the site.
- Construction of a 59-storey hotel and commercial office tower. The tower will have a maximum building height of RL225.88 (205m) and a total gross floor area (GFA) provision of 26,796sqm, and will include the following elements:
    - Five basement levels accommodating a substation, rainwater tank, hotel back of house, plant and services. A porte cochere and four service bays will be provided on basement level 1, in addition to 137 bicycle spaces and end of trip facilities on basement level 2, and 28 car parking spaces. A 12-storey podium accommodating hotel concierge and arrival at ground level, conference facilities, eight levels of commercial floor space and co-working facilities, and hotel amenities including a pool and gymnasium at level 12.
    - 42 tower levels of hotel facilities including 417 hotel keys comprising standard rooms, suites and a penthouse.
    - Two tower levels accommodating restaurant, bar, back of house and a landscaped terrace at level 57.
    - Plant, servicing and BMU at level 59 and rooftop.
- Increase to the width of the existing Bligh Street vehicular crossover to 4.25m and provision of an additional 4m vehicular crossover on Bligh Street to provide one-way access to the porte cochere and service bays on basement level 1.
- Landscaping and public domain improvements including:
    - Replacement planting of three street trees in the Bligh Street frontage,
    - Construction of a landscape pergola structure on the vertical façade of the north-eastern and south-eastern podium elevations,
    - Awning and podium planters, and
    - Provision of a feature tree at the level 57 terrace.
- Identification of two top of awning building identification signage zones with a maximum dimension of 1200mm x 300mm. Consent for detailed signage installation will form part of a separate development application.
- Utilities and service provision.
- Installation of public art on the site, indicatively located at ground level.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 1 October 2022 and issued for the SSDA (SSD48674209).

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 01 October 2022 and issued for the SSDA. Specifically, this report has been prepared to respond to the SEARs requirement issued below.

Item	Description of requirement	Section reference (this report)
12. Noise and Vibration	Provide a noise and vibration assessment prepared in accordance with the relevant NSW Environment Protection Authority (EPA) guidelines. The assessment must detail construction and operational noise and vibration impacts on nearby sensitive receivers and structures and outline the proposed management and mitigation measures that would be implemented.	Section 6

2. The Site

The site for the purposes of this SSDA is a single allotment identified as 4-6 Bligh Street, Sydney and known as Lot 1 in Deposited Plan 1244245. The site has an area of 1,218sqm, and is identified in Figure 1.
The site is relatively flat, with a slight slope ranging from 21m AHD in the north-western corner to 19.5m AHD in the south-western corner.

The site is located within the north-eastern part of Central Sydney in a block bound by Bligh Street to the west, Hunter Street to the south, Chifley Square/Phillip Street to the east, and Bent Street to the north. The surrounding buildings are generally characterised by a mix of commercial office and hotel uses with ground level retail, restaurant and café uses and are of varying heights, ages and styles, including a number of State and local listed heritage buildings.

The site is also located in proximity to a number of Sydney Metro City & Southwest (opening 2024) and Sydney Metro West (opening 2030) station sites.

Specifically, the site is located to the immediate east of the Sydney Metro Hunter Street station (east site), which is located on the corner of Hunter Street and Bligh Street, and approximately 350m east of the Sydney Metro Hunter Street station (west site). The Hunter Street station sites are part of the Sydney Metro West project. SEARs for the preparation of Concept SSDAs for the sites were issued in August 2022.

Approximately 150m to the south of the site is Sydney Metro Martin Place Station site, located to the south of Hunter Street between Castlereagh Street and Elizabeth Street. The Martin Place Station site is currently under construction and forms part of the Sydney Metro City & Southwest project.

The site is occupied by a vacant commercial office building with ground floor retail and basement car parking known as "Bligh House". Completed in 1964, Bligh House is a 17-storey tower inclusive of a three-storey podium with the podium levels built to the Bligh Street alignment and the tower setback from the street frontage. The building was designed by Peddle Thorp and Walker and was constructed as part of the post-World War II development boom in the Sydney CBD. The podium overhang along the footpath provides continuous pedestrian protection. Vehicle access to the site is off Bligh Street via a single 2.6m wide driveway that is restricted by a security gate under one-lane, two-way access arrangements. The driveway provides access to the basement car park, containing 21 car parking spaces.

The site contains no vegetation; however, two existing street trees are located adjacent to the site boundary on Bligh Street. Development consent for the demolition of the existing site structures, excavation and shoring of the site for five basement levels (to a depth of RL9.38m) was granted by City of Sydney on 31 January 2022 (D/2018/892).

Source: nearmap.com

Figure 1: Site Identification Plan

3. Project Description

3.1 Project Overview

This assessment discusses the potential operational noise impact from the proposed development on the nearest most-affected receivers, and the requirements for the proposed development to achieve appropriate internal acoustic amenity within the proposal.

This report provides:

- A summary of measured noise levels on the site and its surroundings;
- Acoustic criteria for the proposed site;
- An acoustic assessment of the current and future noise and vibration environment considering the measured noise levels and applicable types of sources;
- A preliminary noise impact assessment for internal noise levels, operational noise and generated traffic noise;
- A preliminary vibration impact assessment from Sydney Metro;
- General conclusions and professional opinion on potential noise impacts for the proposed development

- Indicative recommendations for noise mitigation measures for the proposed development in order to meet the relevant criteria.

The assessment has been prepared considering the following documents:

- City of Sydney Development Control Plan (DCP), 2012;
- Noise Policy for Industry (NPI), NSW EPA, 2017;
- Road Noise Policy (RNP), NSW EPA, 2011;
- Assessing Vibration: A Technical Guideline, NSW EPA, 2006;
- AS/NZS 2107:2016 Recommended Design Sound Levels and Reverberation Times for Building Interiors
- EN 12354-3:2000 Building Acoustics – Estimation of Acoustic Performance of Buildings from the Performance of Elements – Part 3: Airborne Sound Insulation against Outdoor Sound.

This report is based on our understanding of the proposed project, application of the relevant state guidelines and professional experience within the acoustic field. Therefore, this report shall not be relied upon as providing any warranties or guarantees.

3.2 Noise & Vibration Sensitive Receivers

The site is identified as 4-6 Bligh Street, Sydney (the site) as illustrated in Figure 2. The nearest noise and vibration-sensitive receivers are the Sofitel hotel, and commercial buildings located adjacent to the development and to the west across Bligh St. The commercial facilities include retail spaces and offices. The site location, measurement positions and the nearest sensitive receivers are shown in Figure 2.

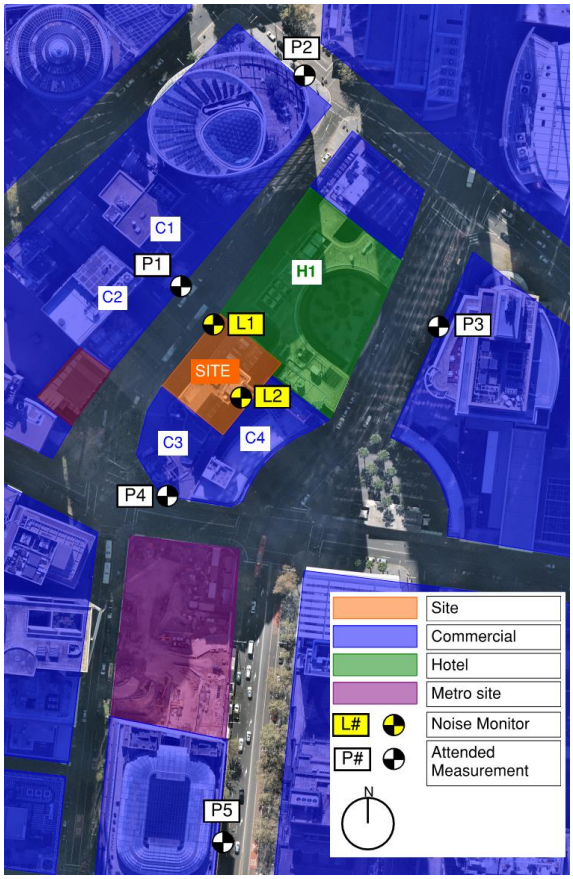


Figure 2: Site Aerial View and Noise Monitoring Locations.

3.3 Acoustic Issues

The acoustic issues related to the development can be summarised as follows:

- Noise intrusion into the guestrooms and sensitive spaces from the surrounding streets and buildings;
- Operational noise from the development (mechanical, rooftops, retail, hotel external common spaces), observed both within the development and in the surroundings;
- Potential vibration and vibration related noise impact from Sydney Metro;
- Façade design to reduce wind related noise; and
- Generated traffic noise.

3.4 Information Sources

The following documentation has been used for the preparation of this report:

- Architectural drawings provided by Woods Bagot within the State Significant Development Application submission set;
- Geotechnical and rail impact study prepared by Coffey Geotechnics for design competition brief, dated 26 July 2017;
- Geotechnical Investigation Repot (ref. SYDGE205019-AD Rev0), Coffey Geotechnics, 16 November 2018
- Interim Rail Corridor CBD Rail Link & CBD Metro, Map 6 out of 9, dated 27 June 2009;
- Transit Noise and Vibration Impact Assessment FTA-VA-1003-06, United States Department of Transportation – Federal Transit Administration (FTA), 2006;
- Sydney Metro Chatswood to Sydenham Environmental Impact Statement Technical Paper 2: Noise and Vibration by SLR (ref. 610.14718R1), dated 28 April 2016;
- Sydney Metro Underground Corridor Protection, Transport for NSW, 16 October 2017;
- Noise data collected on site through the use of noise loggers and a hand-held spectrum analyser.

4. Noise Surveys

4.1 Instrumentation

The equipment used for the noise survey was the following:

- Bruel & Kjær Type 2250 hand-held sound spectrum analyser, S/N 3027679
- Bruel & Kjær Type 4231 calibrator, S/N 1944752
- Ngara noise logger, S/N 878000, presented as L1 in Figure 2
- Ngara noise logger, S/N 87809E, presented as L2 in Figure 2
- Ngara noise logger, S/N 8780C7, presented as L1 in Figure 1
- Ngara noise logger, S/N 878000, presented as L2 in Figure 1

All equipment was calibrated before and after the measurements and no significant drift was found. All equipment carries current traceable calibration certificates that can be provided upon request.

4.2 Attended Noise Survey

Attended noise measurements of 15-minute duration were conducted on site on 6th and 11th of June 2019. The aim of the attended measurements was to characterise the acoustic environment for noise intrusion into the development and to determine any noise impact on the surrounding receivers. The attended measurement results will also be used along with the unattended long-term monitoring results in the assessments in Section 6.

A summary of the measurements taken are shown in Table 1, including comments on the noise environment. Refer to Figure 2 for measurement locations.

Table 1: Attended Noise Measurements – Single Number Descriptors.

Measurement Location	Measurement Time	$L_{Amax,15min}$ dB(A)	$L_{Aeq,15min}$ dB(A)	$L_{A90,15min}$ dB(A)	Comments
P1	6/6/2019 16:31	89	69	63	General traffic hum from surrounding roads, little traffic on Bligh St itself. Buses waiting for shift to start, engines mainly off.
	11/6/2019 22:47	87	69	59	Little traffic, taxis and buses resting mainly engines off.
P2	6/6/2019 16:52	92	72	65	Occasional traffic mainly pulsed traffic from traffic lights. Several buses going past. General traffic hum from surrounding roads.
	11/6/2019 23:06	78	63	58	Intermittent traffic, mainly taxis.
P3	6/6/2019 17:12	83	71	66	Continuous traffic, including a large proportion of buses. Taxi rank on southbound side, mainly hybrids.
	11/6/2019 23:26	79	67	61	Continuous traffic, including a large proportion of buses and some waste trucks. Taxi rank had mainly hybrids.
P4	6/6/2019 17:31	98	74	66	Constant moving or idling traffic, some honking. Buses travelling both east and west.
	11/6/2019 22:27	94	69	61	Pulsed traffic from lights. Waste collection conducted one block down the road. Minor activities on Metro site.
P5	6/6/2019 17:51	89	75	67	Constant traffic, including a large proportion of buses. Bus stop nearby.
	11/6/2019 22:00	98	73	64	Constant traffic, including a large proportion of buses. Bus stop nearby. Occasional honking and faint noises from Metro site.

4.3 Unattended Noise Survey

Two noise monitors were installed in June 2019 at positions L1 and L2, as shown in Figure 1, to measure the existing background noise and traffic noise around the site. The loggers were on site for the duration of 11 days, from 4th to 14th

June 2019. An additional second round of measurements was undertaken in June 2019 at positions L1 and L2, as shown in Figure 1. The loggers were on site for the duration of 10 and 7 days, from the 20th to the 30th June 2019 and between the 20th and the 27th June 2019 respectively.

Logger L1 was placed on the parapet of the podium roof (Level 3) of the existing building on site. The logger was at a height of approximately 10 metres. Logger L2 was installed on the rooftop of the existing building on site, more precisely on top of a large water tank. The building was estimated to be approximately 64 metres tall.

The loggers were set to measure continuous measurements at 15-minute intervals and to record various sound level descriptors. The results of the unattended noise survey are shown in Section 3.3.1 for background noise and in Section 3.3.2 for traffic noise.

In order to ensure monitoring data obtained during adverse weather conditions does not affect the noise levels used to establish acoustic criteria, any rain-affected data during the period of logging has been excluded from the calculations. Where the amount of excluded data within a period exceeded a set limit, the whole period was left out of the assessments.

4.3.1 Background and Ambient Noise

This assessment will consider the method for determining the rating background level (RBL) for each period of the day in accordance with the NSW EPA Noise Policy for Industry (NPI). The NPI defines background and ambient noise for the daytime, evening and Night-time periods as follows:

Day:	7:00am to 6:00pm Monday to Saturday, and 8:00am to 6:00pm Sundays and public holidays.
Evening:	6:00pm to 10:00pm Monday to Sunday and public holidays.
Night:	10:00pm to 7:00am Monday to Saturday, and 10:00pm to 8:00am Sundays and public holidays.

Figure 2 to Figure 6 below illustrate the noise data of each noise monitor, presented as weekly graphs.

Figure 3: Unattended Noise Monitor Data (04/06/2019 – 14/06/2019) – L1

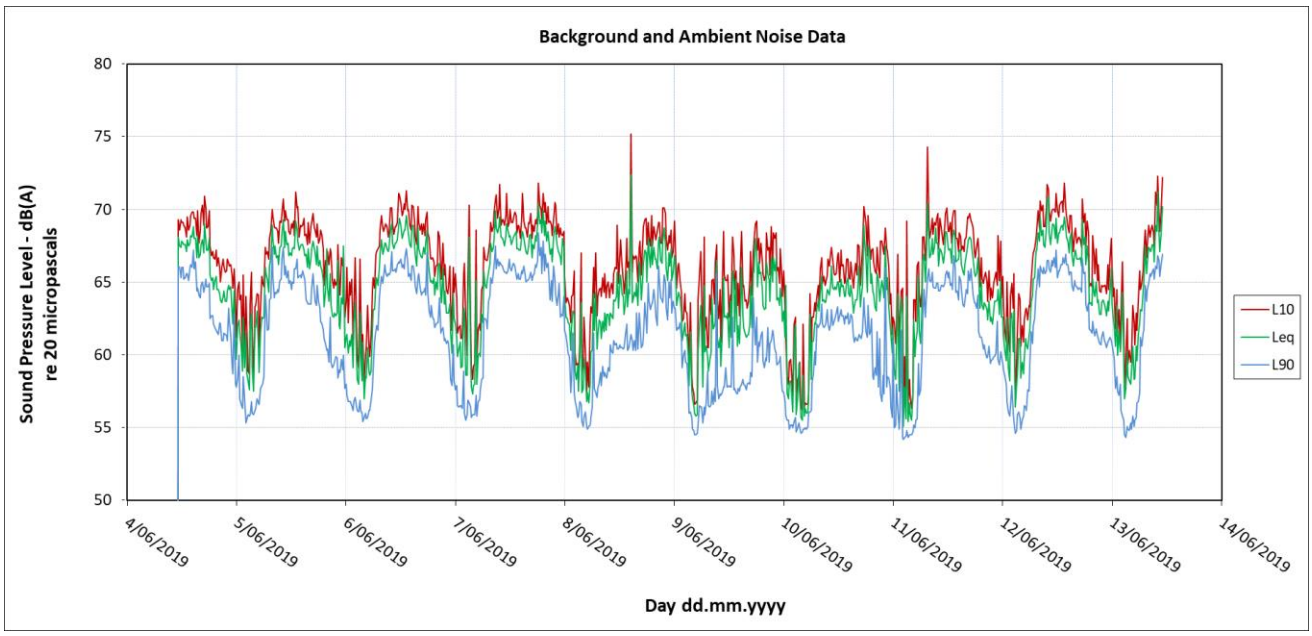


Figure 4: Unattended Noise Monitor Data (04/06/2019 – 14/06/2019) – L2

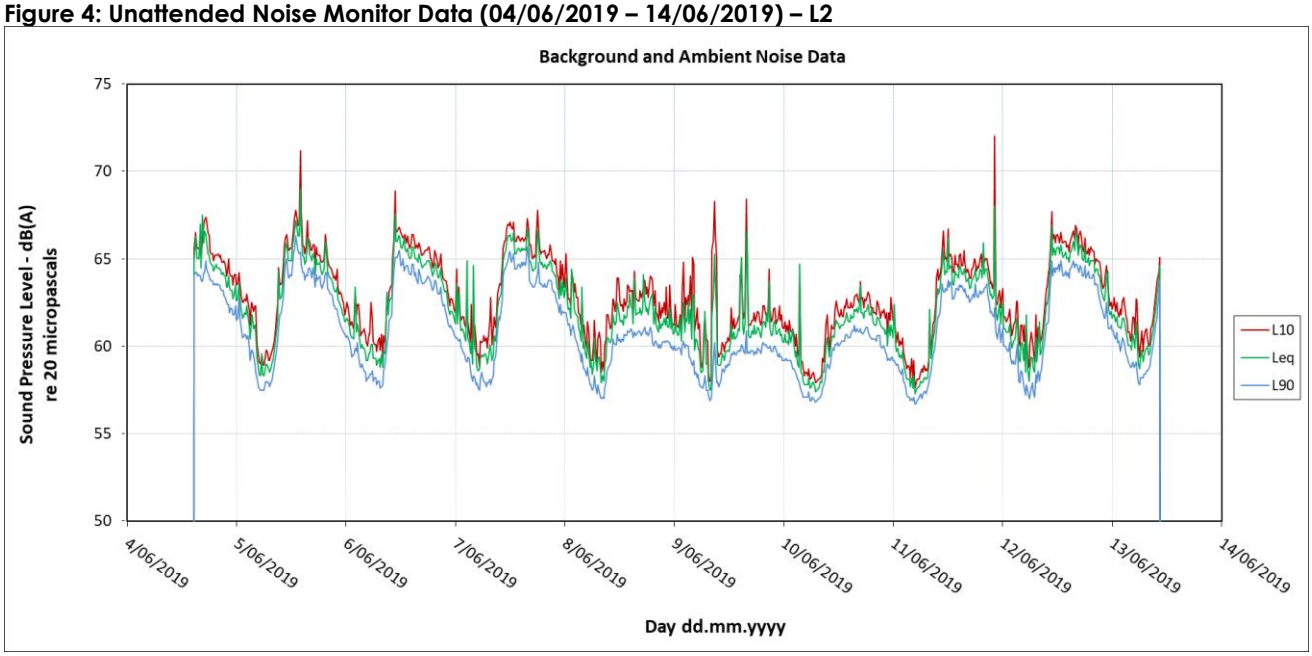


Figure 5: Unattended Noise Monitor Data (20/06/2019 – 27/06/2019)– L1

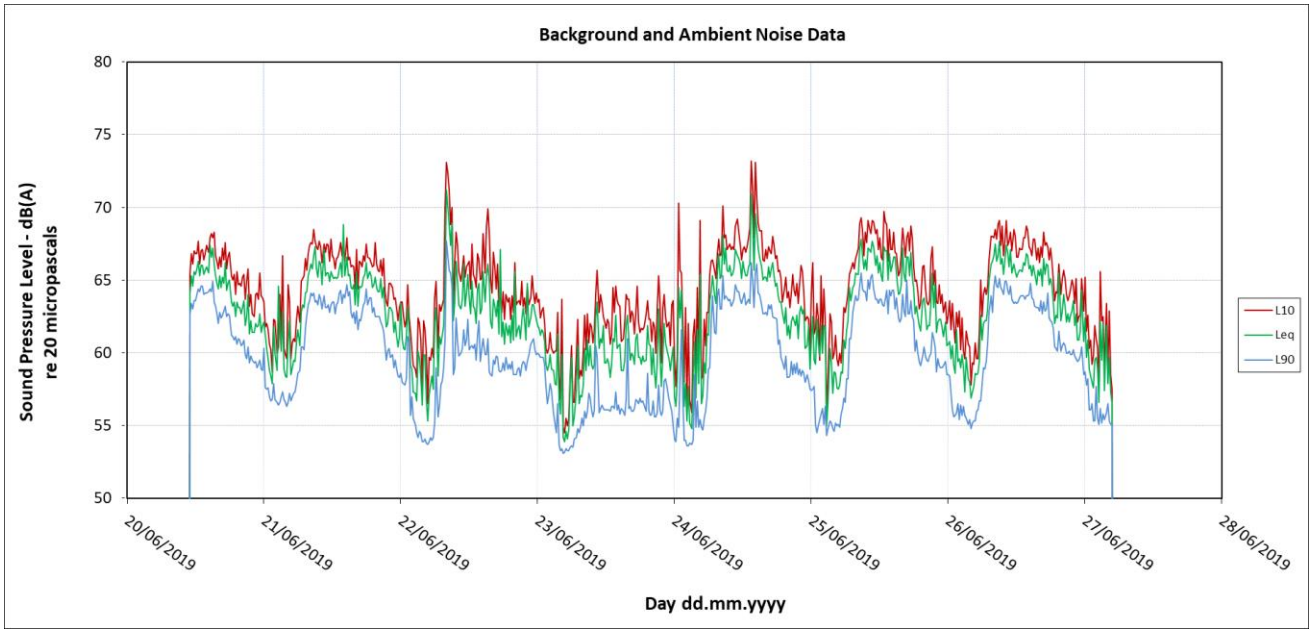
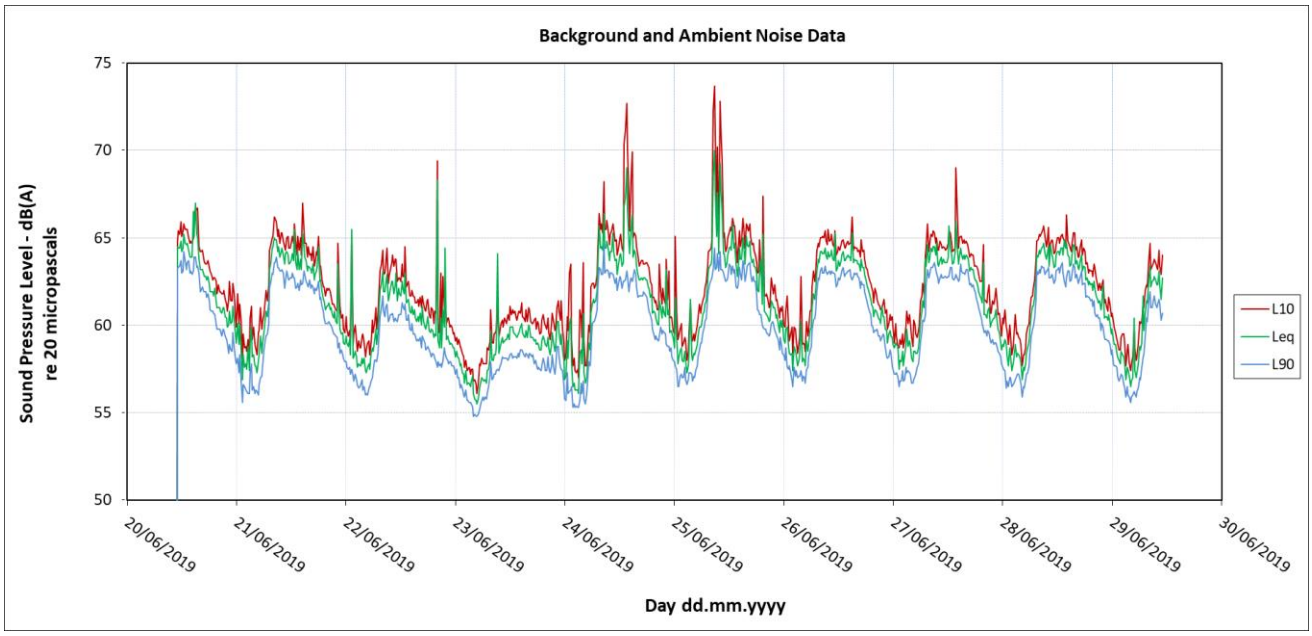


Figure 6: Unattended Noise Monitor Data (20/06/2019 – 30/06/2019)– L2



The local ambient noise environment is typically that of an urban environment, traffic noise being the dominant and constant source of noise. Nearby construction related activities are also likely to have contributed to the measured noise levels, mainly in the form of occasional truck movements. Additionally, there are several large plant on the rooftops of the surrounding buildings.

The noise levels are relatively constant during the day and gradually decrease in the evening. The quietest period during the night typically lasts from midnight to approximately 6am. The difference between daytime and quietest Night-time noise levels is approximately 10dB near street level and 5dB on the rooftop level.

The resulting equivalent noise levels and RBL for each period have been outlined in Table 2 for both loggers L1 and L2. The noise data from logger L1 is considered to represent the existing noise environment at the nearest receivers along Bligh St (H1, C1, C2 and C3), and thus forms the basis for establishing the operational noise criteria at the hotel receiver, see Section 5.2. The data collected at L2 will be used along with L1 to assess the noise intrusion to the proposed development through noise modelling.

Table 2: Unattended Noise Measurements – Background and Ambient Noise.

Location	Equivalent Continuous Noise Level $L_{Aeq,period}$, dB(A)			Background Noise Level RBL, dB(A)		
	Day	Evening	Night	Day	Evening	Night
L1 – 4th to 14th June 2019	67	66	62	64	61	55
L1 – 20th to 27th June 2019	65	64	61	62	60	54
L2 – 4th to 14th June 2019	63	63	61	58	62	58
L2 – 20th to 30th June 2019	63	61	59	62	59	56

The unweighted spectra for the background noise levels $L_{90,15min}$ have been listed in Table 3. For each period, the arithmetic average of the spectrum was calculated over the monitoring days, excluding the periods affected by adverse weather conditions. It can be seen that the levels do not significantly change at higher elevations compared to the ground level.

Table 3: Unattended Noise Measurement Results – Background Noise Spectra.

Location	Period	$L_{90,15min}$, dB								
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
L1	Day	62	62	59	61	58	57	53	44	32
	Evening	61	62	58	58	56	55	51	43	31
	Night	59	59	56	56	53	52	48	40	29
L2	Day	62	62	59	59	58	57	52	44	31
	Evening	61	60	57	57	57	55	51	42	30
	Night	58	58	55	55	54	53	48	40	29

The periods excluded from the analysis above are as follows:

4.3.2 Traffic & Mechanical Noise

In addition to analysing the data for background noise, a noise analysis was conducted following the day and Night-time periods in the City of Sydney DCP and NSW EPA Road Noise Policy (RNP). The results are used for assessing the noise intrusion to the proposed development. The time periods are the following:

Day: 7:00am to 10:00pm

Night: 10:00pm to 7:00am

Logger L1 was positioned to capture traffic noise from Bligh St with direct line of sight. Logger L2 being on top of a water tank on the rooftop was partially shielded from the traffic and surrounding mechanical plant by the tank and the roof structures, capturing the overall traffic hum and some noise from the surrounding rooftop mechanical equipment.

Table 4 below outlines the traffic noise results at both logger locations. The noise descriptors used are the equivalent noise levels for the whole duration of the day and night periods and additionally for the noisiest hour of each period. The following time periods were excluded from the assessment due to the weather conditions:

Table 4: Unattended Noise Measurements – Traffic & Mechanical Noise.

Location	Date	Equivalent Continuous Noise Level $L_{Aeq,period}$, dB(A)		Noisiest 1 hour $L_{Aeq,1h}$, dB(A)	
		Day	Night	Day	Night
L1	4th to 14th June 2019	66	62	68	65
L1	20th to 27th June 2019	64	61	66	63
L2	4th to 14th June 2019	63	61	64	63
L2	– 20th to 30th June 2019	63	59	64	60

5. Acoustic Criteria

5.1 Internal Noise Levels

In this section, internal noise level criteria are presented as regulated by the City of Sydney DCP, NSW EPA guidelines Road Noise Policy (RNP), Noise Policy for Industry (NPI) and Australian Standard AS2107. The more stringent of the possibly overlapping requirements is applicable as the final criterion.

5.1.1 Australian Standard AS2107:2016

In the absence of any relevant internal noise criteria in the City of Sydney DCP, the recommendations from Australian Standard AS2107:2016 have been proposed as the internal noise criteria for the development.

Australian Standard AS/NZS 2107:2016 – *'Acoustics- Recommended design sound levels and reverberation times for building interiors'* specifies target noise levels for internal spaces to the development. Traffic noise intrusion AS 3671 refers to internal noise compliance with AS/NZS2107:2016. Table 5 shows the proposed internal noise level requirements corresponding to the development.

Table 5: Recommended noise levels according to AS/NZS 2107:2016

Type of occupancy/activity	Design Sound Level ($L_{Aeq,t}$) range)dB (A)
Hotel (inner city area, or entertainment districts or near major roads)	
Sleeping areas (night-time)	35 – 40
Bars and lounge	<50
Common Areas (lift lobby, foyer)	45 – 50
Conference areas with sound reinforcement	35 – 45
Reception area	40 – 45
Wellness/Gym	<50
Washrooms and toilets	45 – 55
Kitchen, laundry and maintenance area (BOH areas)	45 – 50
Dining Rooms	40 - 45

5.2 Operational Noise Emission

In addition to listing criteria for noise penetrating into the guestrooms and other sensitive spaces within the development, the noise being emitted from the development into the surroundings must be considered to preserve the existing noise environment for sensitive receivers. Generally, most of the operational noise comes from various mechanical equipment and plant, but for example outdoor terraces should also be considered.

5.2.1 NSW EPA Noise Policy for Industry (NPI)

The NSW EPA Noise Policy for Industry (NPI) is commonly used to set out noise criteria to control operational noise from residential and mixed-use developments (commonly noise generated by associated mechanical plant). The policy outlines a process to define a Project Noise Trigger Level (PNTL) for each sensitive receiver based on the results of the unattended ambient and background noise monitoring. If the PNTL is exceeded, there is a potential noise impact on the community, and mitigation measures should be investigated.

The PNTL can generally be determined by addressing two components:

- Controlling intrusive noise into nearby residences (Intrusiveness Criteria)
- Maintaining noise level amenity for particular land uses (Amenity Criteria)

Once both criteria are established the most stringent for each considered assessment period (day, evening, night) is adopted as the PNTL. It should be noted that as there are no residences in the vicinity of the site, only amenity criteria need to be considered. The components and established noise criteria for the development are presented below.

Amenity Criteria

The general amenity of the area surrounding the development should be maintained. In the NPI, the following is stated:

> *"To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from **all** industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and to some extent sleep disturbance.*
>
> *[…]*
>
> *To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a **project amenity noise level** applies for each new source of industrial noise as follows:*
>
> > *Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB."*

It should be noted that typically the acoustic criteria developed for operational noise purposes are expressed with 15-minute noise levels, whilst the project amenity criteria above is expressed in $L_{Aeq,\ period}$. The project amenity level is converted from the descriptor $L_{Aeq,\ period}$ into the 15-minute descriptor. The NPI assumes that the adjustment is:

$$L_{Aeq,\ 15min} = L_{Aeq,\ period} + 3\ dB.$$

As a result, the project amenity noise level can now be calculated as:

$$\textit{Project amenity noise level}\ L_{Aeq,\ 15min} = \textit{Recommended amenity noise level} - 5\ dB + 3\ dB.$$

The NPI also addresses areas with high traffic noise levels, where the noise from an industrial source can be inaudible, even when the noise from this source exceeds the project amenity noise level. In these cases, the project amenity noise level is determined based on the existing traffic noise levels, assuming that the traffic noise levels are not likely to decrease and exceed the recommended amenity noise level by at least 10 dB. The project amenity noise level, including the conversion from a period level to a 15-minute level, is now defined as:

$$\textit{High traffic project amenity noise level}\ L_{Aeq,\ 15min} = L_{Aeq,\ period(traffic)} - 15\ dB + 3\ dB.$$

The project amenity noise levels for all receivers have been outlined in Table 6.

Table 6: Project Amenity Noise Levels.

Type of Receiver	Noise Amenity Area	Time of Day	Recommended Amenity Noise Level, $L_{Aeq,period}$	Project Amenity Noise Level, $L_{Aeq,15min}$
H1 Hotel	Urban	Day	65	63
		Evening	55	53
		Night	50	49*
C1, C2, C3, C4 Commercial	All	When in use	65	63

Note: * Determined using the high existing traffic noise level method.

Project Noise Trigger Levels

As the intrusiveness criteria are not applied to the relevant receiver types, the amenity criteria above determine the PNTL. The PNTL for all receivers have been listed in Table 7.

The levels should be addressed at the reasonably most-affected point on or within a residential property within 30 m from the residence, at least 3 m from a reflective surface and at a height of 1.2-1.5 m. For commercial properties, the assessment location should be chosen as the reasonably most-affected point within the property boundaries.

Table 7: Project Noise Trigger Levels.

Type of Receiver	Noise Amenity Area	Time of Day	Recommended Amenity Noise Level, $L_{Aeq,period}$	Project Amenity Noise Level, $L_{Aeq,15min}$
H1 Hotel	Urban	Day	65	63
		Evening	55	53
		Night	50	49
C1, C2, C3, C4 Commercial	All	When in use	65	63

5.2.2 Sleep Disturbance

Sleep disturbance can be caused by the operational noise from the development at the nearby residences or other premises providing accommodation. As in Section 1.1 for sleep disturbance within the development, the maximum level events should be considered in bedrooms at the nearby hotel in H1 to prevent sleep disturbance (awakenings and disturbance to sleep stages).

The NPI considers the operational noise emissions from the new building and sets the following criteria for the external noise levels at the nearby residential receivers:

- *$L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.*

The resulting project-specific levels have been listed in Table 8. Only the maximum level criterion will be adopted as the PNTL for Night-time is lower than the L_{Aeq} level determined for sleep disturbance.

Table 8: Sleep Disturbance Criteria – H1.

Period	Sleep Disturbance Criteria	
	L_{Amax}, dB(A)	$L_{Aeq,15min}$, dB(A)
Night (10:00pm to 7:00am)	70	60

5.2.3 Entertainment Premises

Music/entertainment and patron noise from entertainment premises must be controlled to avoid adverse impacts on the surrounding noise-sensitive receivers. For this development, the majority of the surroundings consist of commercial buildings, within which the noise levels should comply with the following typical City of Sydney condition:

- The $L_{A10,15min}$ noise level emitted from the licensed premises must not exceed the background noise level $L_{A90,15min}$ in any octave band centre frequency (31.5 Hz–8 kHz inclusive) by more than 3 dB when assessed indoors at any affected commercial premises.

In this case, hotels are considered to fall under commercial premises. The background noise should be measured in the absence of any noise from the premises. When noise levels are assessed within a habitable room, windows should be closed.

As the indoor noise levels within the receiver are not known, the conservative approach is to apply the condition to the measured external noise levels. Refer to Table 9 for a summary of the proposed criteria for the entertainment premises of the development. The criteria are cumulative limits for all entertainment premises, if several, and are based on the RBL spectra in Table 9. The time periods as defined in the NPI have been used.

Table 9: Maximum $L_{10,15min}$ Spectra from Licensed Premises at Commercial Premises – Conservative External.

Location	Period	Maximum (Octave Band Centre Frequencies) L_{10}, dB								
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
H1 C1 to C4	Day	65	65	62	64	61	60	56	47	35
	Evening	64	65	61	61	59	58	54	46	34
	Night	62	62	59	59	56	55	51	43	32

5.3 Noise from Generated Traffic

Road traffic noise impact from generated traffic is assessed in accordance with the NSW Road Noise Policy (RNP). The policy divides land use developments into different categories and lists the respective criteria for each case. However, since the proposed development is surrounded by commercial premises and temporary accommodation, no specific external noise limits are provided.

Table 10: Recommended Internal Noise Levels within Nearest Sensitive Receivers – AS/NZS 2107.

Type of occupancy	Design Sound Level Range, L_{Aeq}, dB(A)
Hotel sleeping areas (Night-time)	35 to 40
Office areas	35 to 45

5.4 Vibration Criteria

The possible nearby sources of vibration for the development are the Sydney Metro tunnels passing the development on both the eastern and western sides. This section outlines the relevant vibration criteria for both human comfort and structural damage as well as criteria for structure-borne noise created by vibrations. The design of the basement levels should be such that the maximum limits set out in the criteria presented in the following sections are not exceeded within the development.

5.4.1 Human Comfort

Structural vibration in buildings can be detected by occupants and can affect them in many ways including reducing their quality of life and also their working efficiency. Complaint levels from occupants of buildings subject to vibration depend upon their use of the building and the time of the day. The guide on preferred values for human comfort have been extracted from the NSW EPA *Assessing Vibration: A Technical Guideline*. The criteria for continuous and impulsive vibration are summarized in Table 11.

Table 11: Preferred and Max Weighted RMS Values for Continuous and Impulsive Vibration Acceleration – 1-80 Hz

Place	Time	Vibration Acceleration (mm/s^2)			
		Preferred		Maximum	
Continuous Vibration		z axis	x and y axis	z axis	x and y axis
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices	Day or Night-time	0.020	0.014	0.040	0.028
Workshops	Day or Night-time	0.040	0.029	0.080	0.058
Impulsive Vibration		**z axis**	**x and y axis**	**z axis**	**x and y axis**
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices	Day or Night-time	0.64	0.46	1.28	0.92
Workshops	Day or Night-time	0.64	0.46	1.28	0.92

Disturbance caused by vibration will depend on its duration and its magnitude. This methodology of assessing intermittent vibration levels involves the calculation of a parameter called the Vibration Dose Value (VDV) which is used to evaluate the cumulative effects of intermittent vibration. The criteria applicable when considering periods of intermittent vibration are presented in Table 12.

Table 12: Acceptable Vibration Dose Values for Intermittent Vibration ($m/s^{1.75}$).

Location	Daytime		Night-time	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical areas	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

In addition to the above, specific vibration criteria for metro operations have been proposed in the Sydney Metro EIS Technical Paper 2 Table 74. The values have been summarised in Table 13, and are expressed as the maximum 1 second RMS vibration levels (dBv re 1 nm/s) not to be exceeded for 95% of rail pass-by events. The aim of these criteria is to limit the vibration dose value caused by the frequent metro operations to the values in Table 12 above.

Table 13: Human Comfort Vibration Criteria from Metro Pass-By.

Location	Period	Vibration Level L_v, dBv
Critical areas	Any time	100
Residences	Daytime	106
	Night-time	103
Offices, schools, educational institutions and places of worship	When in use	112

5.4.2 Structural Damage

Ground vibration criteria are defined in terms of levels of vibration emission that will not damage surrounding buildings or structures. It should be noted that human comfort criteria are normally expressed in terms of acceleration whereas structural damage criteria are normally expressed in terms of velocity. The human comfort criteria are also often exceeded before a risk of structural damage.

Structural damage criteria are presented in German Standard DIN 4150-Part 3 *Structural vibration in buildings – Effects on structures* and British Standard BS 7385-2:1993 *Evaluation and Measurement for Vibration in Buildings*. The British Standard BS 7385-2:1993 establishes vibration values for buildings based on the lowest vibration levels above which damage has been credibly demonstrated. These values are evaluated to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as 95% probability of no effect. The aforementioned values are summarised in Table 14.

Table 14: Transient Vibration Guide Values for Cosmetic Damage – BS 7385-2:1993.

Type of Building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial or light commercial type buildings	50 mm/s	N/A
Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s	20 mm/s (50 mm/s at 40 Hz and above)

Table 15 indicates the vibration limits presented in DIN 4150-Part 3 to ensure structural damage does not occur.

Table 15: Guideline Values of Vibration Velocity (v_i) for Structural Damage – DIN 4150-Part 3.

Line	Type of Structure	Vibration velocity, v_i, in mm/s			
		Foundation At a frequency of			Plane of floor of uppermost full storey
		Less than 10 Hz	10 to 50 Hz	50 to 100 Hz *	All Frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that, because of their particular sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8
*For frequencies above 100 Hz, at least the values specified in this column shall be applied.					

5.4.3 Structure-Borne Noise Criteria

Generally, ground borne noise is associated more closely with rail operations than roads. In accordance with the Department of Planning – Development Near Rail Corridors and Busy Roads – Interim Guideline (DNRCBR), where residential buildings are constructed over or adjacent to land over tunnels, ground-borne should be designed so that the 95th percentile of train pass-bys complies with a ground-borne L_{Amax} noise limit of 40dBA (daytime) or 35dBA (night-time) measured using the "slow" response time setting on a sound level meter. However, this guideline does not include recommendations for other non-residential buildings, such as reception or employee facilities spaces. The recommended noise levels for *'Other noise sensitive areas'* within hospitals are used as a guideline for reception or employee facilities spaces in this study. Moreover, for commercial and meeting areas a more stringent criteria are adopted for this project. Table 16 summarises the Structure-Borne Noise Criteria applicable to the proposal.

Table 16: Structure-Borne Noise Criteria

Level	Space	Structure-Borne Noise Inaudibility Criterion $L_{Amax,slow,95\%}$, dB(A)
B2	Employee facilities, general office	<45
GF	Reception	<45
L2	Commercial, meeting	<40
L14	Standard guestroom	<35

6. Acoustic Impact Assessment

6.1 External Noise Intrusion

Noise modelling was conducted to determine the facade noise levels. Based on these noise levels, recommendations for appropriate façade constructions and glazing to achieve the interior noise level requirements in Section 5.1 are provided.

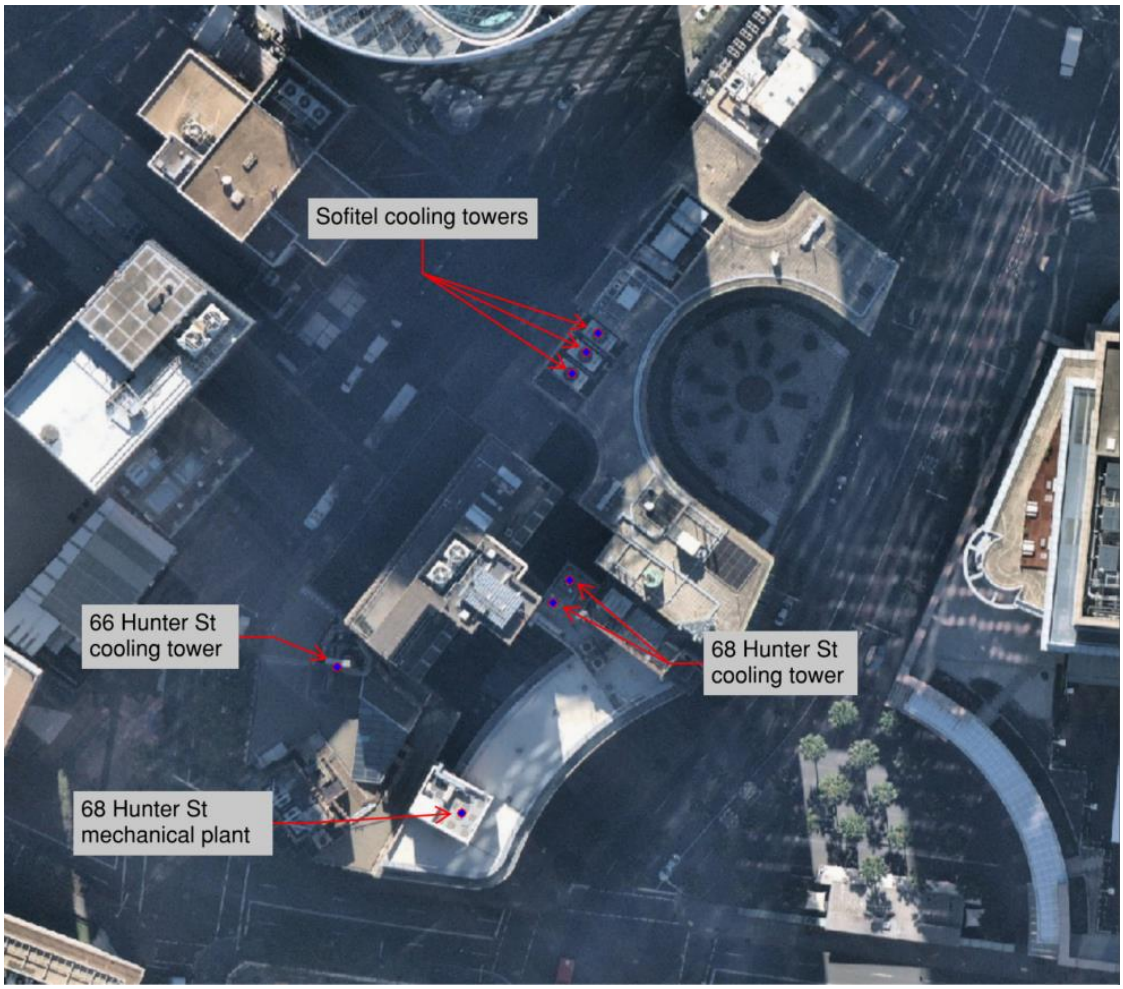
6.1.1 Noise Model

In order to provide acoustic amenity to occupants of the proposed development and comply with the project specific internal noise levels, the acoustic performance of the building facades was assessed. 3D acoustic modelling for external noise intrusion from the surrounding roads and mechanical plant was conducted using the software SoundPlan (Version 8.2).

Noise emissions and impacts from vehicle movements on the surrounding roads, including Bligh St, Bent St, Phillip St, Hunter St, Castlereagh St and Elizabeth St as the relevant noise sources were modelled in accordance with the CoRTN prediction protocol. Noise sources to represent the mechanical plant of the existing buildings were also included in the predictions. Figure 7 shows the location of the mechanical plant included in the model.

Note: the selection of the mechanical plan associated with the development is not finalised, these noise sources are not included in the prediction presented in this study. These sources are required to be assessed and appropriate mitigations should be considered during the detailed design progresses.

Figure 7: Location of mechanical plant included in the model



Model Validation

The modelled traffic noise levels have been validated to study the accuracy of the predicted results. The model is calibrated to the measured noisiest hours of the day and night periods performed in June 2019 presented in Sections 4.2. The differences between the predicted and measured noise levels are shown to be less than 1 dB. Results (measured vs. predicted) within 2dBA are generally considered acceptable considering the expected accuracy of the noise modelling procedures in conjunction with variability in traffic speeds and pavement wear. On this basis, the model is considered validated and suitable for the prediction of future traffic noise levels without any calibration factor applied.

Future Traffic Prediction

At this time, projected (10 year) traffic data is not available. To account for future (year 2029) traffic volume increase, it is assumed that traffic volume on the scrounging nearby road network rises by 2% each year throughout day and night times. To estimate the year 2029 traffic noise levels, a correction factor of +0.9 dB was applied to the predicted noise levels.

Uncertainty Factor

A safety margin of +1.0 dB was applied to the façade noise levels, after which calculations were made to determine the sound insulation performance required for the glazing on each façade.

6.1.2 Glazing Requirements

The general limiting factor of the performance of a building façade in term of noise attenuation is the glazing. In order to achieve the internal noise levels during Day and Night periods established in this assessment, the minimum required glazing performances have been assessed in accordance with the criteria provided in Section 5.

The predicted future façade noise maps have been used to determine the sound insulation performance required for the glazing on each façade. The required glazing performances are calculated based on the standard EN 12354-3:2000 *Building Acoustics – Estimation of Acoustic Performance of Buildings from the Performance of Elements – Part 3: Airborne Sound Insulation against Outdoor Sound*. The calculations take into account the area of the glazing and the volume of the room, and they assume sealed façades with no ventilation gaps or openings and the glazing requirements are expressed in decibels as the weighted sound reduction index Rw.

Based on the external noise intrusion assessment, the minimum acoustic performance requirements for the glazing to meet the internal noise criteria as shown in Section 5 are presented in Appendix A. Typical glazing systems to meet these performance requirements have also been provided in Table 17 below. These recommended glazing systems are minimum requirements to satisfy the acoustic criteria, and other glazing systems with equal or better acoustic performance can be used if so required for e.g. structural or thermal reasons.

Table 17: Glazing performance requirements

Minimum acoustic performance	Typical Double Glazed System
R_W 31	6mm/12mm air gap/6mm
R_W 39	8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass
R_W 41	6 mm glass + 12 mm air gap + 10.38 mm laminated glass
R_W 41	6 mm glass + 12 mm air gap + 12.38 mm laminated glass
R_W 46	12 mm glass + 12 mm air gap + 12.5 mm VLam Hush

Note: The performance expressed in terms of Rw includes the glass, the window frame and the window seals

When choosing suitable glazing systems, it should be noted that different products perform differently at low, middle and high frequencies. As a result, special attention should be given to the sound reduction across the various frequency ranges, since poor performance especially in the lower end can lead to higher-than-expected internal noise levels from road traffic.

6.1.3 Other Noise Sources

In addition to the traffic and mechanical equipment included in the noise model presented in the preceding sections, other noise sources can potentially have a noticeable noise impact on the development. These noise sources could be e.g. patron and music noise from outdoor terraces within the development, events in the vicinity of the site and noise from future developments.

Future developments are assumed to include sufficient acoustic controls into their design and events are expected to occur at a reasonable distance to not significantly impact the proposed development. Entertainment noise from the facilities within the development itself, however, should be assessed in more detail as the design progresses. Possible mitigation methods include increasing the acoustic performance of glazing in noise-sensitive spaces near the entertainment areas, limiting the hours of operation and limiting the number of patrons.

At this stage of the design, preliminary patron numbers and use scenario are available for the pool area event space and terrace. A maximum of 200 people with a Normal Vocal effort (not raised) is estimated to attend an event in this area, out of whom maximum 80 would be on the outdoor terrace. Some background music is also expected to be played indoors.

Assuming the façade to the pool terrace is open and that 50% of the patrons are speaking loudly at a time, it is expected that the glazing proposed in Section 6.1.2 above is sufficient during the day and evening times. This applies to both the office spaces below and guestrooms above the pool level. During the night from 10pm to 7am, the events are recommended to be limited to the indoor event space with a closed façade to ensure the internal noise level criteria are met within the guestrooms above.

6.2 Operational Noise Emissions

The operational noise of the development is expected to consist of various mechanical equipment on rooftops and within plant rooms on various levels, as well as of the noise produced by activities on outdoor terraces and within entertainment spaces. At this stage of the design process, plans regarding the mechanical services and functions have not yet been finalised, and thus detailed noise assessments should be conducted once the information is available.

However, a preliminary analysis of the mechanical equipment has been conducted to determine the maximum cumulative noise level allowed so that the Project Noise Trigger Levels (PNTL) in Section 5.2.1 will not be exceeded. The level of entertainment noise has also been discussed. See the sections below for the results and possible mitigation methods.

6.2.1 Mechanical – Proposed Maximum Cumulative Noise Levels

The mechanical services concept currently revolves around a water-cooled air conditioning system, where two cooling towers would be located in a rooftop plant room. For the commercial levels, the air conditioning would be implemented centrally, whereas the guestrooms would have individual FCUs sharing the source of outside air.

In the current design, plant rooms to house the various equipment are located in the basement, on the rooftop and additionally on Levels 11, 13, 33 and 54. In addition to the cooling towers, the equipment includes:

- Exhaust fans, e.g. plant room, kitchens, bathrooms, communal spaces, carpark
- Supply air fans, e.g. carpark
- Various pumps
- Chillers
- Hot water plant

In order to determine the maximum cumulative noise level allowed from the abovementioned equipment to comply with the PNTL, a worst-case scenario of all equipment operating simultaneously was assumed. The night-time period for the hotel receiver H1 and the daytime period for the commercial receivers C1 to C4 were considered. Only dedicated plant areas have been included in the calculations until more detailed information becomes available on equipment locations.

Table 18 outlines the estimated maximum cumulative sound power level spectra and total levels allowed to emanate from each plant area to achieve the relevant noise criteria at the surrounding receivers. Typical plant spectrum has been utilised and will need to be amended once more specific unit selections are made in the detailed design stages. Due to the hotel receiver H1 having stricter PNTL especially at Night-time, quieter equipment or additional acoustic treatment might need to be installed to mechanical noise sources on the northern side of the development. The PNTL are not expected to be exceeded if the mitigation methods in the following Section are taken into account in the design process.

Table 18: Maximum Sound Power Levels

Plant Location	SWL re 10^{-12} W, dB								Overall, dB(A)
	63Hz	125Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz	
Rooftop	106	108	104	101	96	90	87	78	102
L11, L13, L33, L54 North	70	72	68	65	60	54	51	42	66
L11, L13, L33, L54 South	81	83	79	76	71	65	62	53	77

To meet the external noise emissions requirements for noise generated by the mechanical plant and equipment the following general practices to mitigate noise from the operation of the mechanical plant and equipment are recommended:

- Where possible, locate the plant as far away from possible noise-sensitive receivers as practical to minimise the aggregate noise level;
- Select low-noise mechanical equipment;
- Acoustic louvres or solid barriers may be required, surrounding plant items on the rooftop. This mitigation will likely be driven by internal noise criteria within the residential spaces of the proposed development;
- Where possible, locate noisy plant within an enclosed plant space;

Note that the proposed noise mitigation measures are preliminary only as the design is yet to be finalised. However, it is likely that acoustic screening be required around the large rooftop plant, especially the cooling towers. On the northern side of the development, acoustic treatment within the plant rooms might also need to be more extensive than on the southern side, including attenuators and/or acoustic louvres.

A detailed acoustic assessment will be conducted during the design stage as more information becomes available regarding performance data of specific mechanical equipment or any further mechanical design information. Specific acoustic treatment will be proposed to ensure compliance with the project noise trigger levels established in Section 5.2.1 at the surrounding sensitive receivers.

6.2.2 Entertainment Premises

Indoor Areas

The proposed development includes several ancillary facilities including restaurants, bars and amenities as detailed below:

- 24-hour hotel reception check-in desk and lobby lounge area
- Hotel lounge bar – Ground floor
- Function area – Level 01
- Hotel restaurant – Level 57
- Hotel enclosed rooftop bar

The noise associated with the operation of these spaces has been considered against proposed hours listed in the Operational & Security Management Plan and the noise criteria outlined in Section 5.2.3.

Based on the expected number of patrons and the usage of these spaces, the noise is expected to meet the noise criteria shown in Section 5.2.3 with implementation of the minimum acoustic performance of the façade as proposed in Appendix A.

Outdoor Areas

There are a number of outdoor terraces associated with the proposed development including the following:

- Pre-function – Level 01
- Pool area – Level 12
- Restaurant terrace – Level 57

As noted in the Operational & Security Management Plan, there will not be background music for any outdoor areas and therefore has been assessed as patrons only. Based on the indicative number patrons, the hours of operation, the noise mitigation measures from the Operational & Security Management Plan noise levels at the nearest receiver are not expected to exceed the recommended noise criteria outlined in Section 5.2.3.

A further noise assessment should be carried out during detailed and prior to Construction Certificate once more information is available to further demonstrate that the proposal will satisfy the noise criteria presented in Section 5.2.3.

6.3 Vibration Intrusion

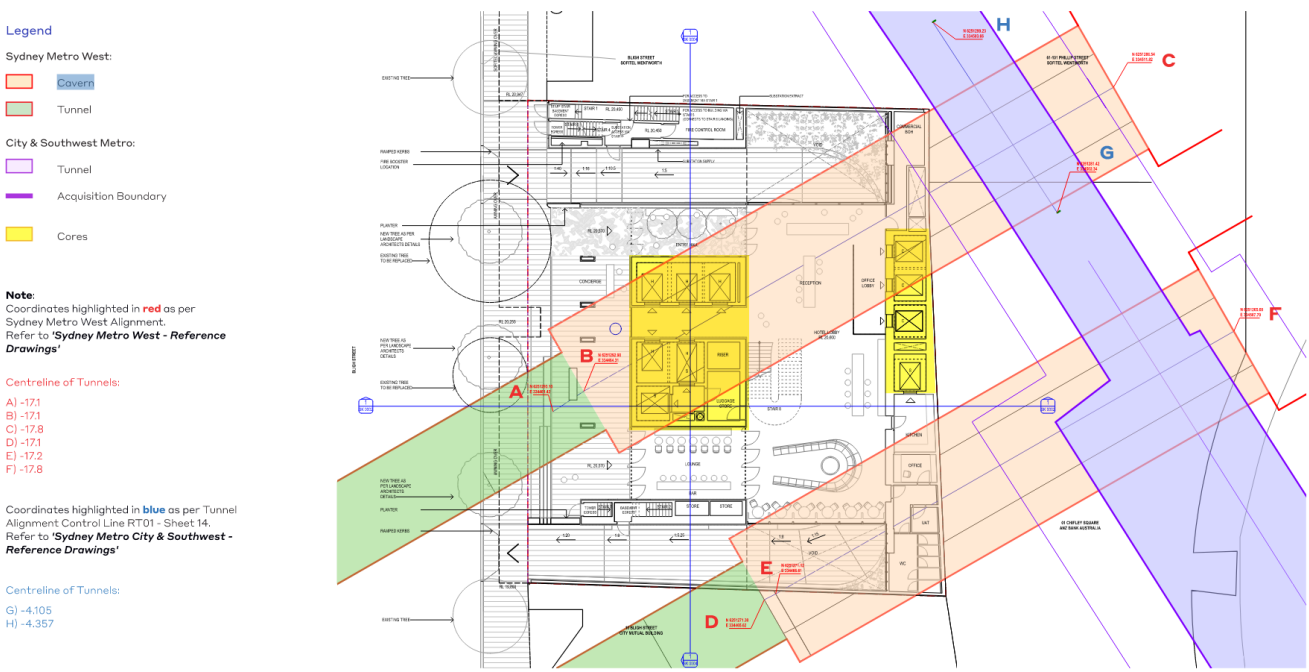
In this section the potential vibration and vibration related noise impacts on the development are considered.

6.3.1 Vibration Sources

The nearby vibration sources are limited to underground rail corridors below the site. The nearest tunnels are currently under construction and form part of the Sydney Metro City & Southwest, running north-south on the western and eastern sides of the site. The southbound tunnel reserve partially overlaps with the site footprint in the eastern corner. However, the tunnel will be approximately 1.4 metres below the lowest proposed basement level. As such, the proposed development will be within the second reserve as defined by Sydney Metro protection guidelines. The distance between the first reserve and the closest point of the proposed development is expected to be approximately 1 metre. The location of the tunnels respective to the site is shown in Appendix B.

Figure 8: CBD Rail Link & CBD Metro Tunnel Locations

Ground Floor Plan



Future rail corridors for CBD Rail Link and CBD Metro have also been planned near and below the site as shown in the figure above in Figure 8. These tunnels are expected to run deeper underground than the Sydney Metro City & Southwest due to the current tunnelling taking place relatively close to existing basements and ground level.

6.3.2 Assessment Methodology

A desktop study was conducted to assess the vibration and vibration generated noise impacts from the underground rail tunnels on the development, focusing on the closest Sydney Metro tunnel near the eastern corner of the site.

The general methodology used in the Sydney Metro EIS Technical Paper 2 was used in this assessment. In summary, the vibration impacts from the vibrating metro tracks to the floor slabs of various spaces within the development were assessed, including attenuation provided by e.g. distance, ground conditions, building foundations and transmission within building structures. The vibration transmitted to a floor slab can set the slab in motion, potentially creating audible noise. The noise level can be estimated from the vibration level.

In the assessment, the following assumptions were made:

- The ground type is mainly medium to high strength sandstone, as per the geotechnical investigation report;
- The foundation type of the development is unknown at this stage and so piles have been assumed as the worst case. The minimum distance between a foundation pile and the tunnel perimeter is assumed to be 5 metres;
- Nearest track sections are of standard attenuation type (refer to Sydney Metro EIS Technical Paper 2);
- The source reference vibration levels are as outlined in the Sydney Metro EIS Technical Paper 2 Table 75, reproduced in Table 21 $L_{v,max,slow,95\%}$ levels have been used, representing the levels not exceeded 95% of the time for a train pass-bys;
- The maximum train speed below the site is 65 km/h;
- A maximum of 8 train pass-bys per direction occur in any 15-minute period;
- P-wave (compressive) velocity in sandstone is 2,000 m/s;
- Mechanical loss factor (η) is 0.04;
- No correction is applied for turnouts;
- Coupling loss factor (dB) values adopted for CBD Metro as per table below;

Table 19: Coupling Loss Factor

	Frequency, Hz												
	20	25	31.5	40	50	63	80	100	125	160	200	250	315
Coupling loss factor, dB	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0

- Radiation efficiency: calculations were undertaken for two types of concrete slabs as per table below;

Table 20: Radiation Efficiency of Slab

	Frequency										
	20Hz	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz
1 x 200mm concrete slab	0.17	0.24	0.31	0.40	0.48	0.57	0.67	0.78	0.98	1.21	1.41

- Vibration amplification: from the slab on piles (basement 5) to the basement 4 slab;
- Vibration attenuation: floor attenuation from basement 4 to the level of interest;
- A typical receiver room with dimensions of 3m x 4m x 2.7m (L x W x H) with a Reverberation Time (RT60) of 0.6 secs is assumed;
- Assumed area size of the vibrating surface (concrete slab): 16 m^2

Table 21: Reference Source Vibration Level Spectrum on Tunnel Wall, 80 km/h.

Vibration Level $L_{v,max,slow,95\%}$ re 1 nm/s, dBv																		
5 Hz	6.3 Hz	8 Hz	10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz
-	-	-	77	78	78	77	80	86	86	86	85	84	84	89	86	82	79	78

Notes:

1. At locations where the curve radius is less than 600m, vibration levels may be up to 5 dB higher than specified above.

2. At locations adjacent to turnouts, vibration levels may be up to 10 dB higher than specified above.

6.3.3 Results – Vibration

The predicted vibration levels of a train pass-by in the southbound tunnel are shown in Table 22 for a representative selection of spaces in the development. These spaces were chosen to illustrate the impact on the sensitive spaces of the various levels of the building.

Table 22: Predicted Vibration Levels within Sensitive Spaces from Single Train Pass-By – Southbound Tunnel.

Level	Space	Predicted Vibration Level of Pass-By, dBv	Vibration Level Criterion, dBv	Satisfies? Yes/No
B2	Employee facilities, general office	90	112	Yes
GF	Reception	87	112	Yes
L2	Commercial, meeting	84	112	Yes
L14	Standard guestroom	79	106 (day-time)	Yes
L14	Standard guestroom	79	103 (night-time)	Yes

6.3.4 Results – Structure-Borne Noise

The predicted ground borne noise level from a train pass-by in the southbound tunnel are shown in Table 23.

Table 23: Predicted Structure-Borne Noise Levels from Single Train Pass-By – Southbound Tunnel.

Level	Space	Predicted Noise Level of Pass-By[1,2] $L_{Amax,slow,95\%}$, dB(A)	Structure-Borne Noise Inaudibility Criterion $L_{Amax,slow,95\%}$, dB(A)	Compliance, exceedance
B2	Employee facilities, general office	46	<45	No, up to 1 dB
GF	Reception	41	<45	Yes
L2	Commercial, meeting	37	<40	Yes
L14	Standard guestroom	23	<35	Yes

Note: These values are based on a desktop study only. The actual measured site values might vary ±3 dB.

6.3.5 Discussion

Based on the results presented in the previous section, ground-borne noise is expected to meet the criteria established in this Section 5.4.3 at most receiver locations. The closest identified receiver locations are employee facilities, general office proposed to be located in the basement B2. The maximum noise level for some train pass-bys is anticipated to be up to 1 dB higher than the recommended noise levels selected in this study, which is deemed insignificant.

It should be noted that the predicted noise levels in Table 23 are the maximum noise levels during a train pass-by. When averaging the noise impact from the metro operations over a 15-minute ($L_{Aeq,\ 15min}$) observation period, the cumulative internal level is expected to be significantly lower than those presented in Table 23.

The potential additional noise and vibration from the northbound Metro tunnel on the western side of the site is not expected to noticeably increase the noise and vibration impact on the development. The distance between the northbound train tracks and the development basement is significantly larger than for the southbound tracks, increasing the distance attenuation of the vibrations within the ground before entering the building structures. Thus, the noise and vibration from the northbound trains will not noticeably add to the levels produced by the southbound trains, even when the trains are passing the development simultaneously in both tunnels.

6.4 Compliance Testing

Compliance testing is likely to be required after all the construction is finished and the building is operational. The aim of the testing procedures is to demonstrate compliance with the acoustic criteria outlined in this report and in the possible acoustic conditions listed by the approving authorities.

The types of acoustic testing likely to be undertaken include:

- Internal noise level measurements within all types of occupied spaces to demonstrate compliance with criteria in Section 5.1 and any additional criteria in approval conditions;
- External noise level measurements at the nearest receivers to demonstrate compliance with operational noise criteria in Section 5.2 and any additional criteria in approval conditions;
- Vibration measurements within the building to demonstrate compliance with vibration criteria in Section 5.4 and any additional criteria in approval conditions.

7. Conclusion

The existing and predicted noise environment has been assessed for 4-6 Bligh St, Sydney, and its nearby surroundings. This document forms part of the documentation package to be submitted to authorities as part of the SSDA process.

This report has provided criteria, in-principle treatment and design requirements, which aim to achieve the statutory criteria discussed in Section 5. The criteria aim to provide acoustic amenity to the future occupants of the proposed development and maintain the surrounding noise environment.

Section 6 details the various acoustic impact assessments conducted for this development. The external noise intrusion, focusing on traffic noise on the surrounding streets and noise from existing rooftop mechanical plant (not associated with the proposal), has been predicted in Section 6.1, and glazing recommendations have been provided based on the modelling results in Section 6.1.2. High-level noise impact form other noise sources are discussed in Section 6.1.3.

The operational noise impact of the development on the surroundings has been discussed in Section 6.2. Based on the preliminary analysis of mechanical services noise, the impact on the nearest noise sensitive receivers is expected to comply with the set criteria. Acoustic screening is likely to be required on the rooftop plant area, and attenuators and/or acoustic louvres might be needed within some of the plant rooms.

The noise associated with entertainment premises have been assessed at the nearest receiver and is expected to comply with the criteria set out in Section 5.2.3.

Generated traffic noise is addressed in Section 5.3. The potential increase in traffic volumes generated by the site is expected to result in minimal increase in traffic noise levels along Bligh St. Bligh St is also used as a resting area for public bus services, which have higher noise levels associated with them compared to typical cars.

Section 6.3 summarises the desktop study conducted to estimate the potential vibration intrusion and structure-borne noise within the proposed development. The most likely sources of vibration are the Sydney Metro tunnels running under the eastern and western sides of the site. Based on the study, ground-borne noise is expected to meet the criteria established in this Section 5.4.3 at most receiver locations. The closest identified receiver locations are employee facilities, general office proposed to be located in the basement B2. The maximum noise level for some train pass-bys is anticipated to be up to 1 dB higher than the recommended noise levels selected in this study, which is deemed insignificant. No adverse impact is expected on the guestrooms.

With the aforementioned considered noise and vibration sources, it is of our opinion that the development and its proposed site are not expected to generate or be exposed to excessive noise or vibration, provided that appropriate design considerations and amelioration measures are implemented. Even though no assessment can be considered as being thorough enough to preclude all potential environmental impacts, having given regard to the above listed conclusions, it is the finding of this assessment that the development application should not be refused on acoustic grounds.

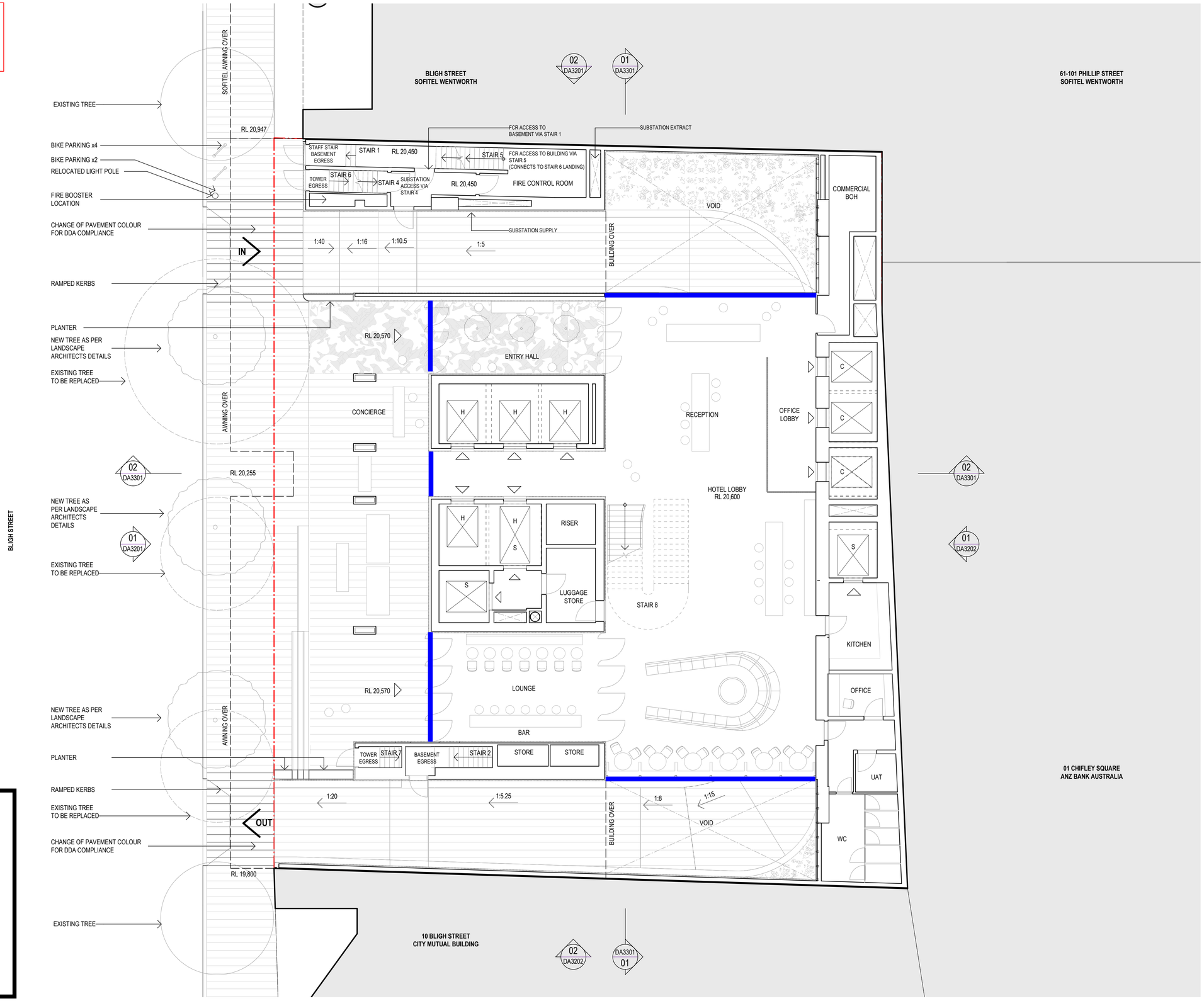
The information presented in this report shall be reviewed if any modifications to the features of the development specified in this report occur, including and not restricted to selection of air-conditioning units, layout of equipment, modifications to the building and introduction of any additional noise source.

Appendix A Glazing Requirements

Stantec

PROJECT : 4-6 Bligh Street
PROJECT NUMBER : 301351060
SKETCH TITLE : Glazing Requirements
DATE : 22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

Notes

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[S] Service Lift
[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
W–B™ WOODS BAGOT

Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

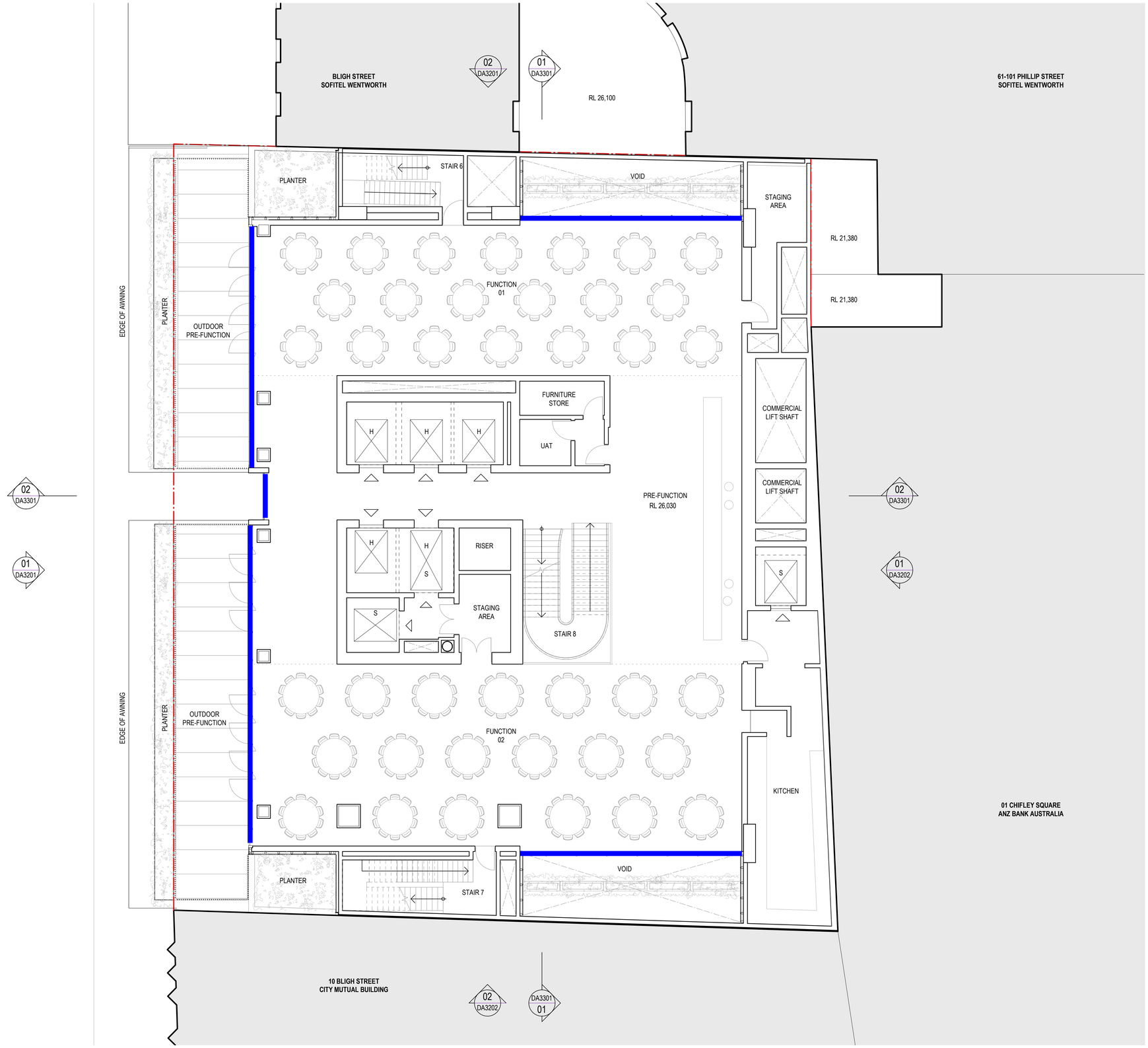
Sheet title
Floor Plan
Ground Floor

Sheet number DA2200
Revision A
Status FOR SSDA

Stantec

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
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Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
W–B™ WOODS BAGOT

Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 01 - Events

Sheet number DA2201
Revision A
Status FOR SSDA

Stantec

PROJECT : 4-6 Bligh Street
PROJECT NUMBER : 301351060
SKETCH TITLE : Glazing Requirements
DATE : 22/12/2022

Preliminary

Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
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Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

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Project number 121736
Size check 25mm
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Sheet title
Floor Plan
Level 02 - Meeting and Co-Working

Sheet number **DA2202**
Revision A
Status FOR SSDA

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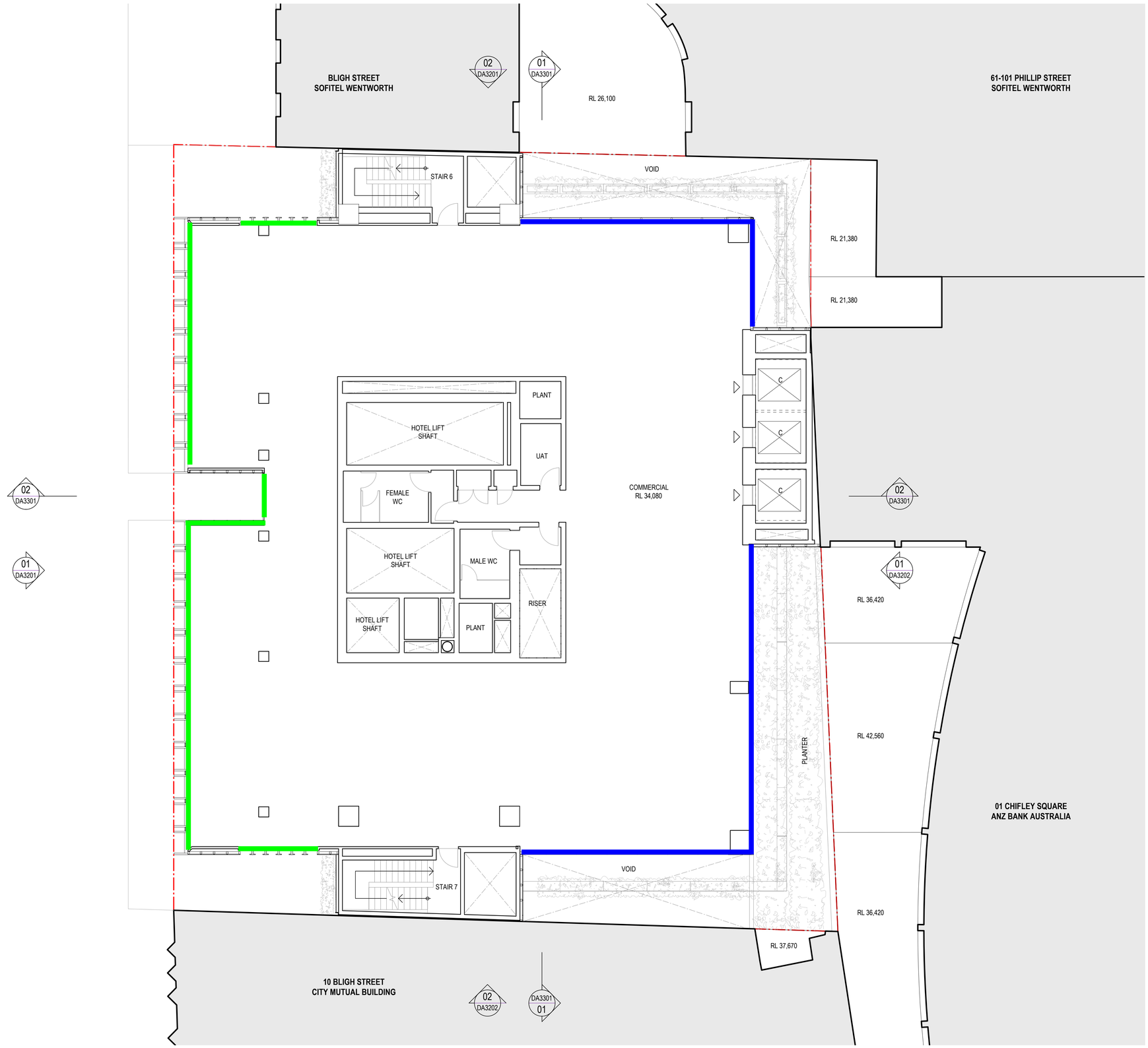
Stantec

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
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Recent revision history

#	Status	Description	Date
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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

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Project number 121736
Size check 25mm
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Approved KD
Sheet size A1
Scale 1 : 100

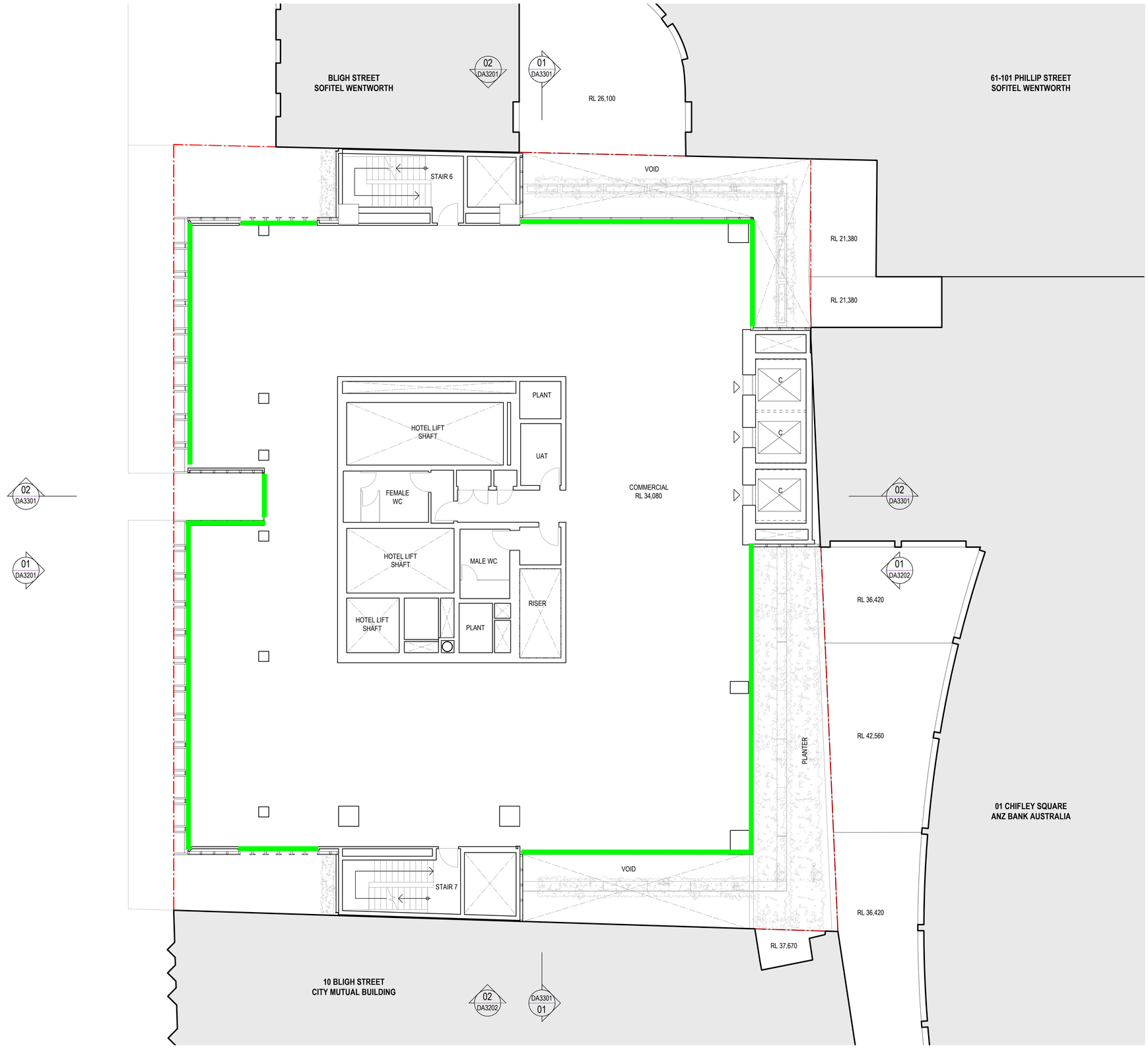
Sheet title
Floor Plan
Level 03 to 09 - Commercial
Level 3-8

Sheet number **DA2203**
Revision A
Status FOR SSDA

Stantec

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
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Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[S] Service Lift
[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
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Project number 121736
Size check 25mm
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Approved KD
Sheet size A1
Scale 1 : 100

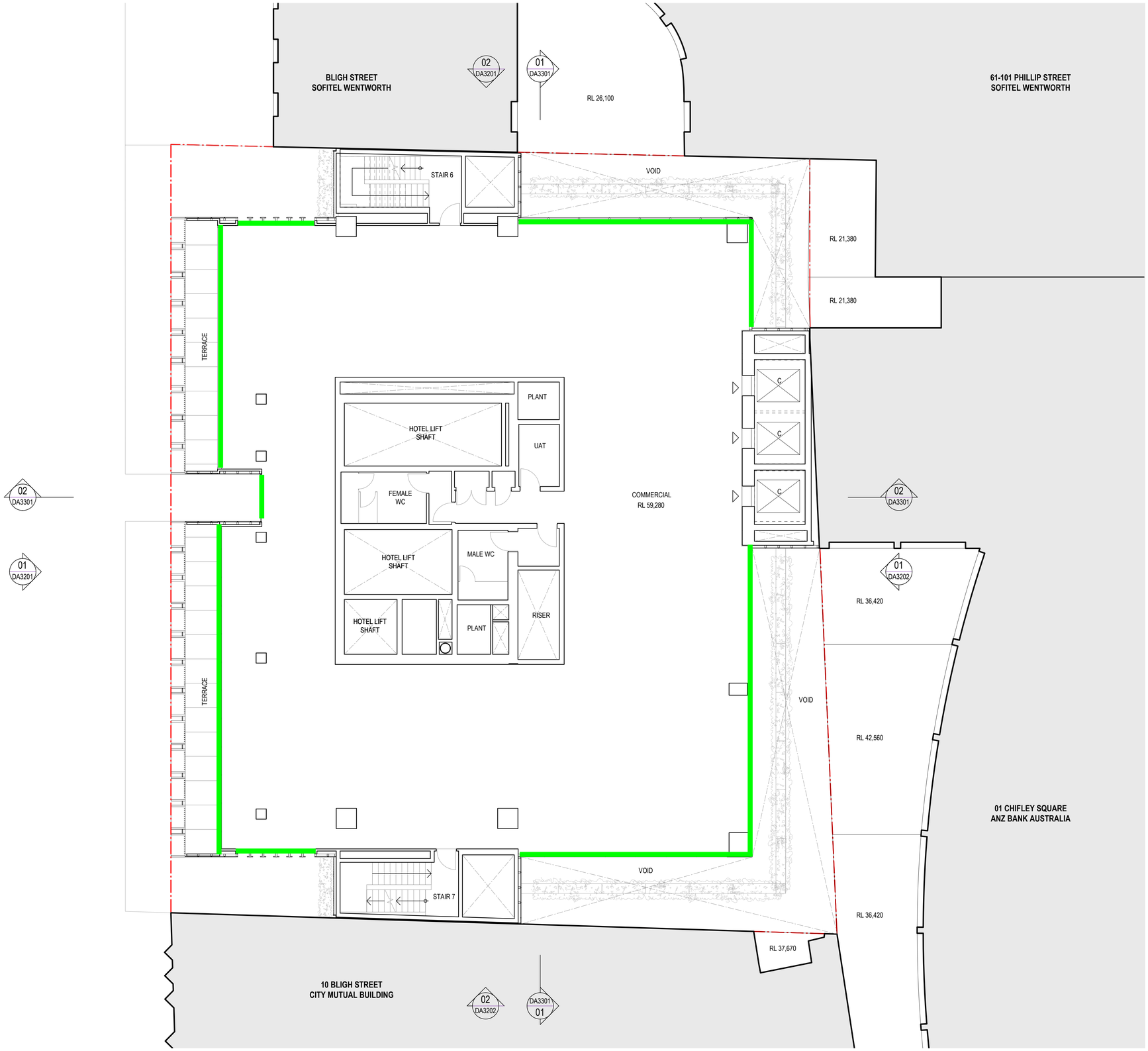
Sheet title
Floor Plan
Level 03 to 09 - Commercial
Level 9

Sheet number **DA2203**
Revision A
Status FOR SSDA

Stantec

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
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A		SSDA Submission	19.12.22

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Project
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Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 10 - Commercial

Sheet number **DA2210**
Revision A
Status FOR SSDA

Stantec

PROJECT : 4-6 Bligh Street
PROJECT NUMBER : 301351060
SKETCH TITLE : Glazing Requirements
DATE : 22/12/2022

Preliminary

Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
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#	Status	Description	Date
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Project
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Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
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Sheet title
Floor Plan
Level 11 - Plant

Sheet number DA2211
Revision A
Status FOR SSDA

Stantec

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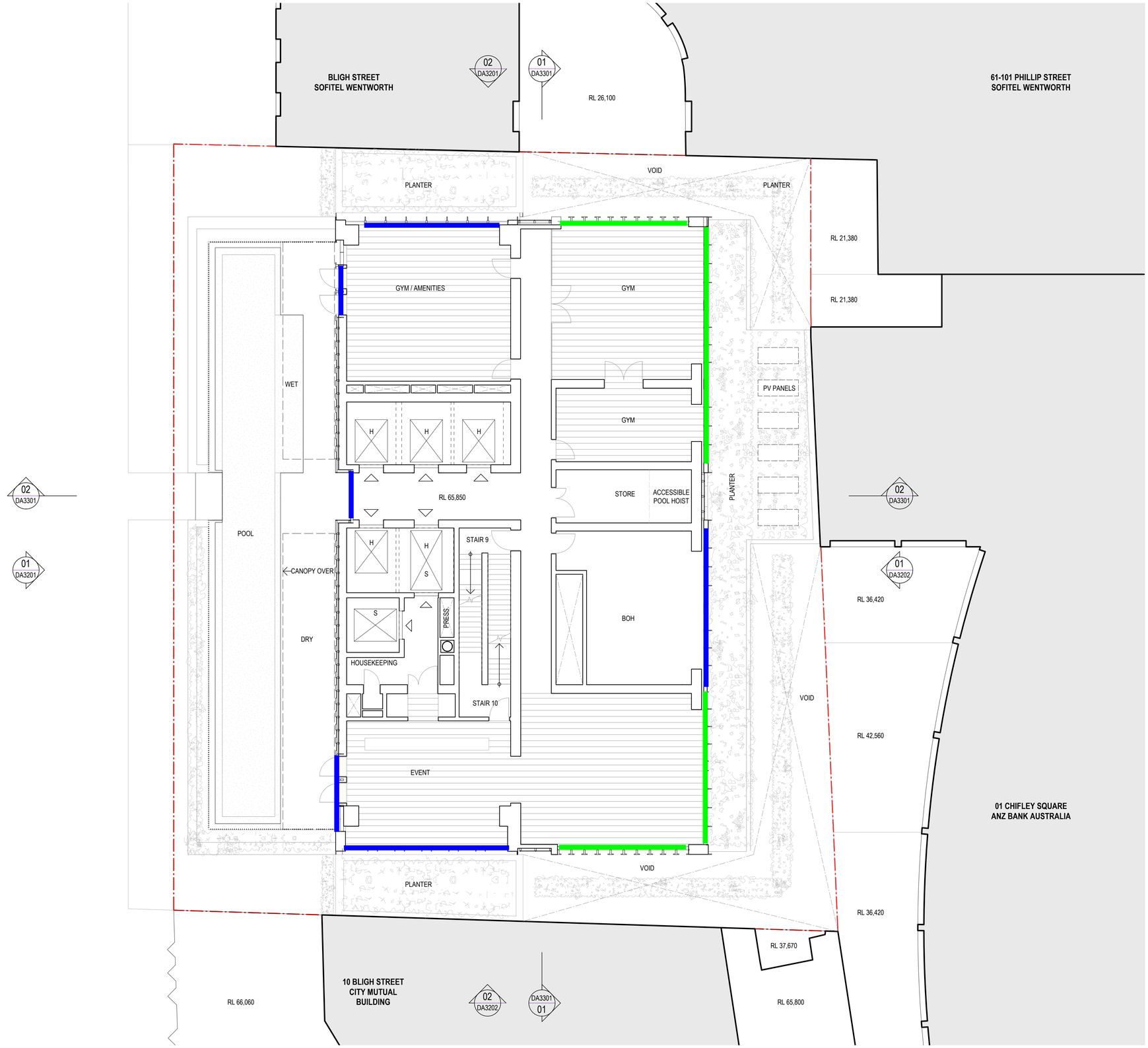
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
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Recent revision history

#	Status	Description	Date
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Project
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Project number 121736
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Approved KD
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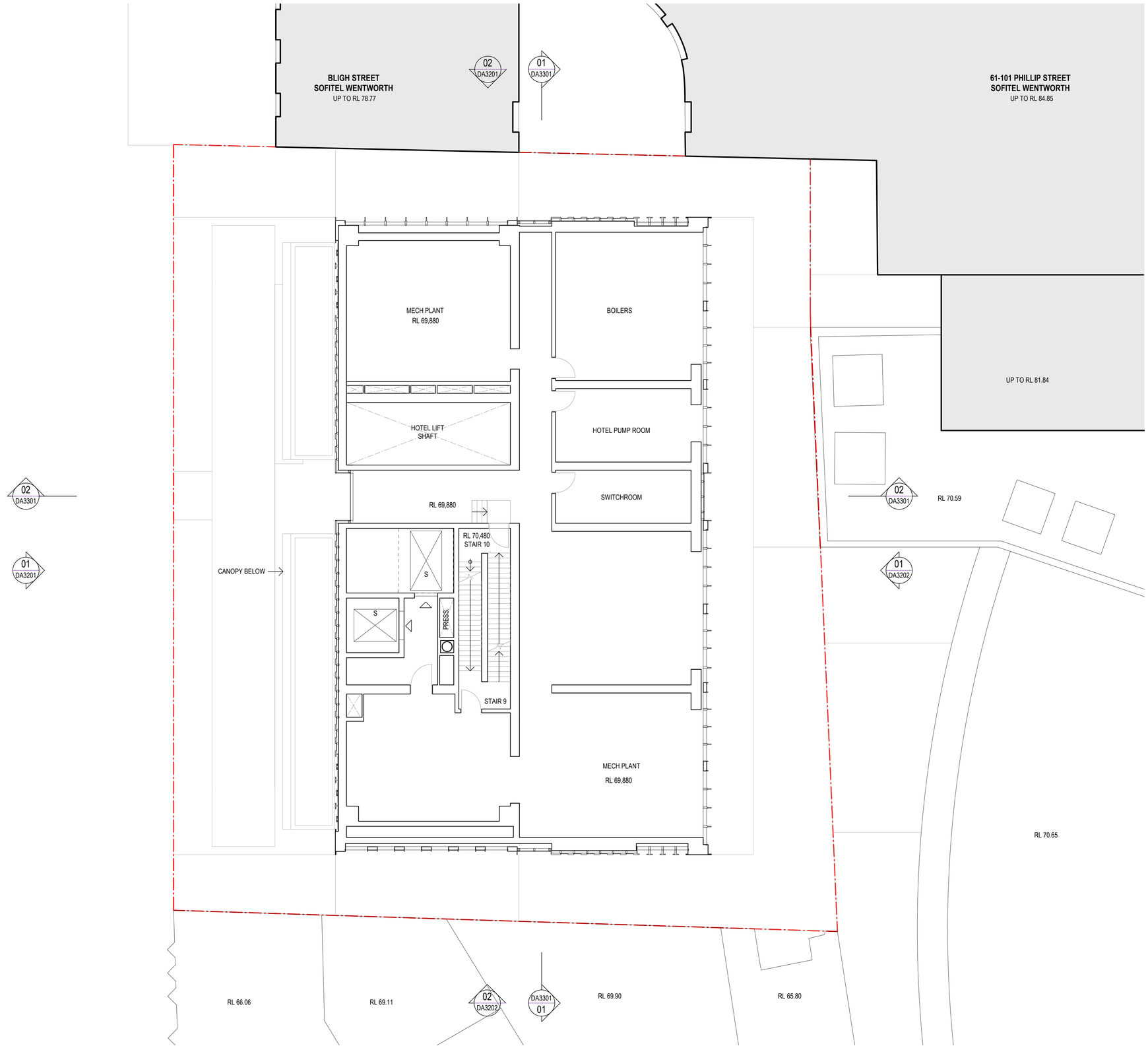
Scale 1 : 100

Sheet title
Floor Plan
Level 12 - Wellness

Sheet number DA2212
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
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Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

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Project number 121736
Size check 25mm
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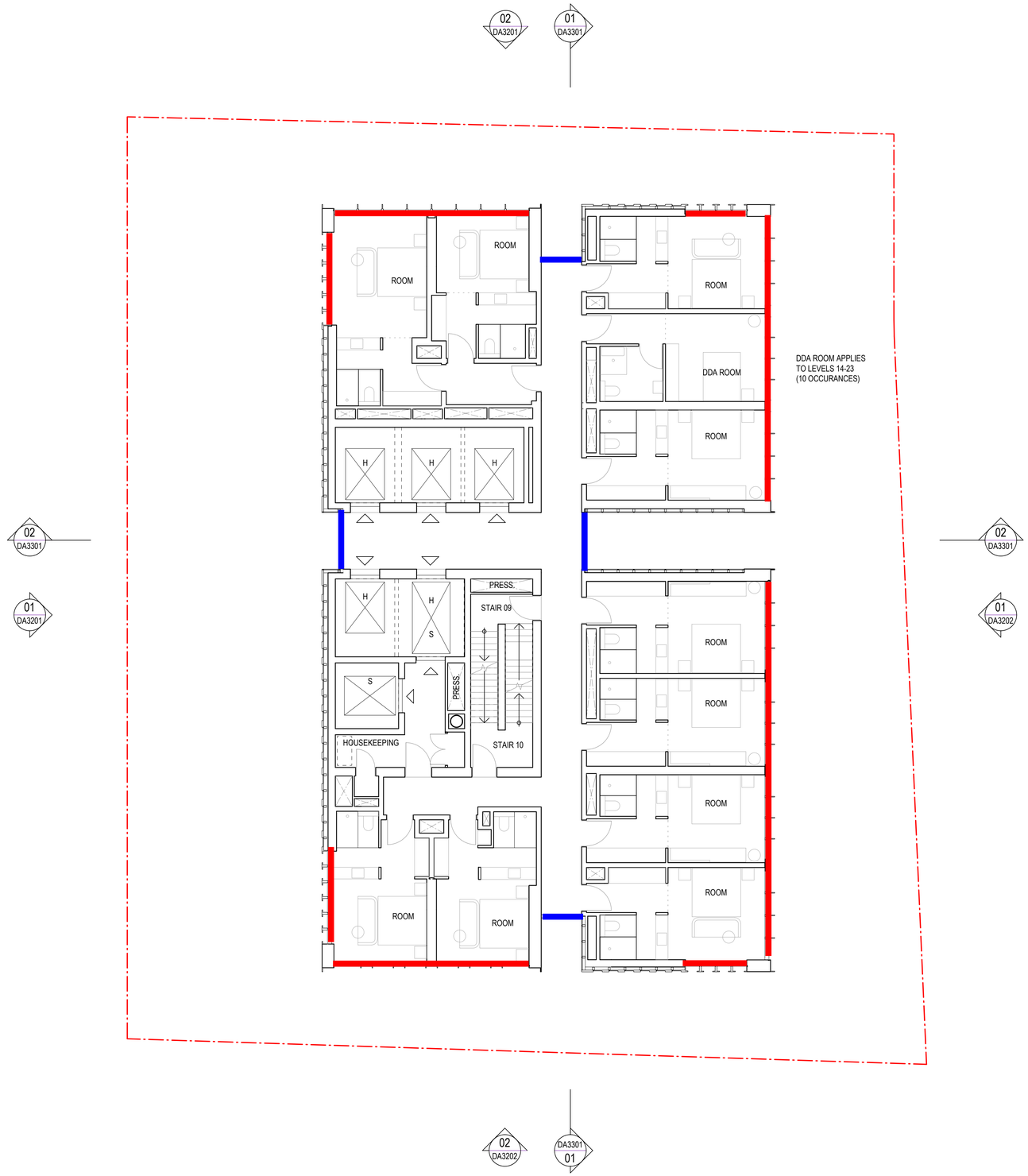
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 13 - Plant

Sheet number DA2213
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
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Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
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Project number 121736
Size check 25mm
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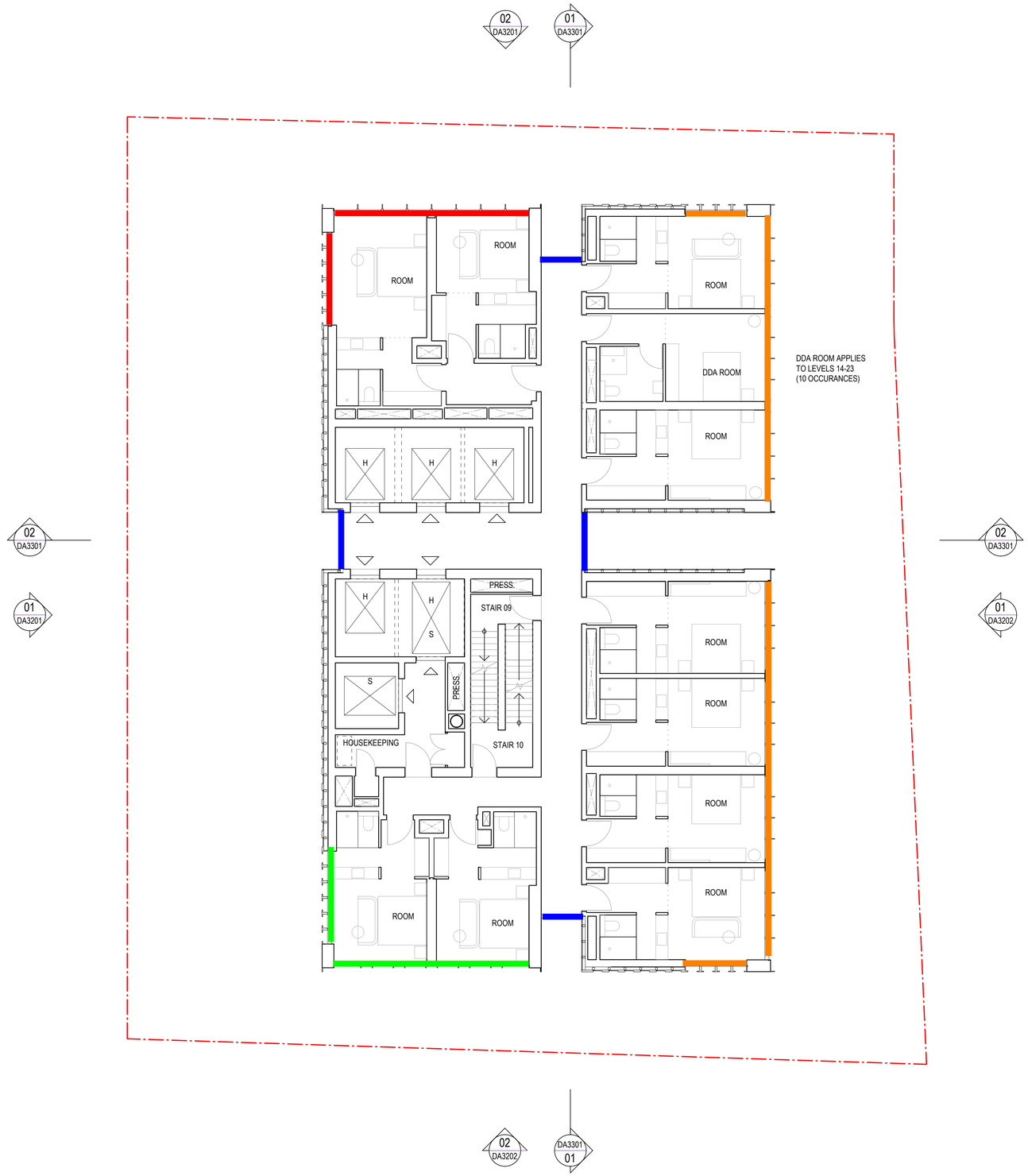
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 14-32 - Rooms
Level 14-19

Sheet number **DA2214**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

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Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
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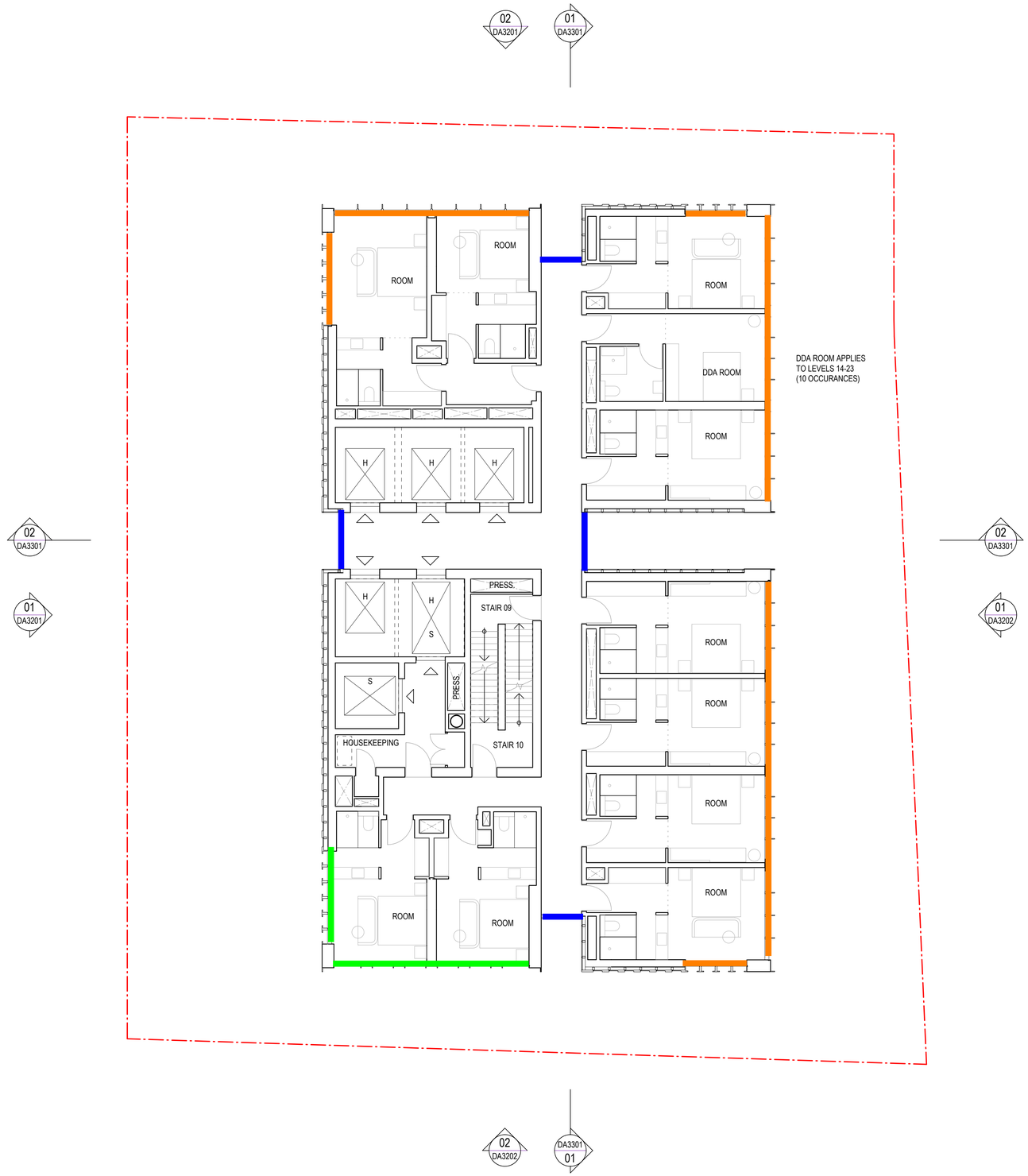
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 14-32 - Rooms
Level 20-23

Sheet number **DA2214**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

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Recent revision history

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[C] Commercial Lift

Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

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Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

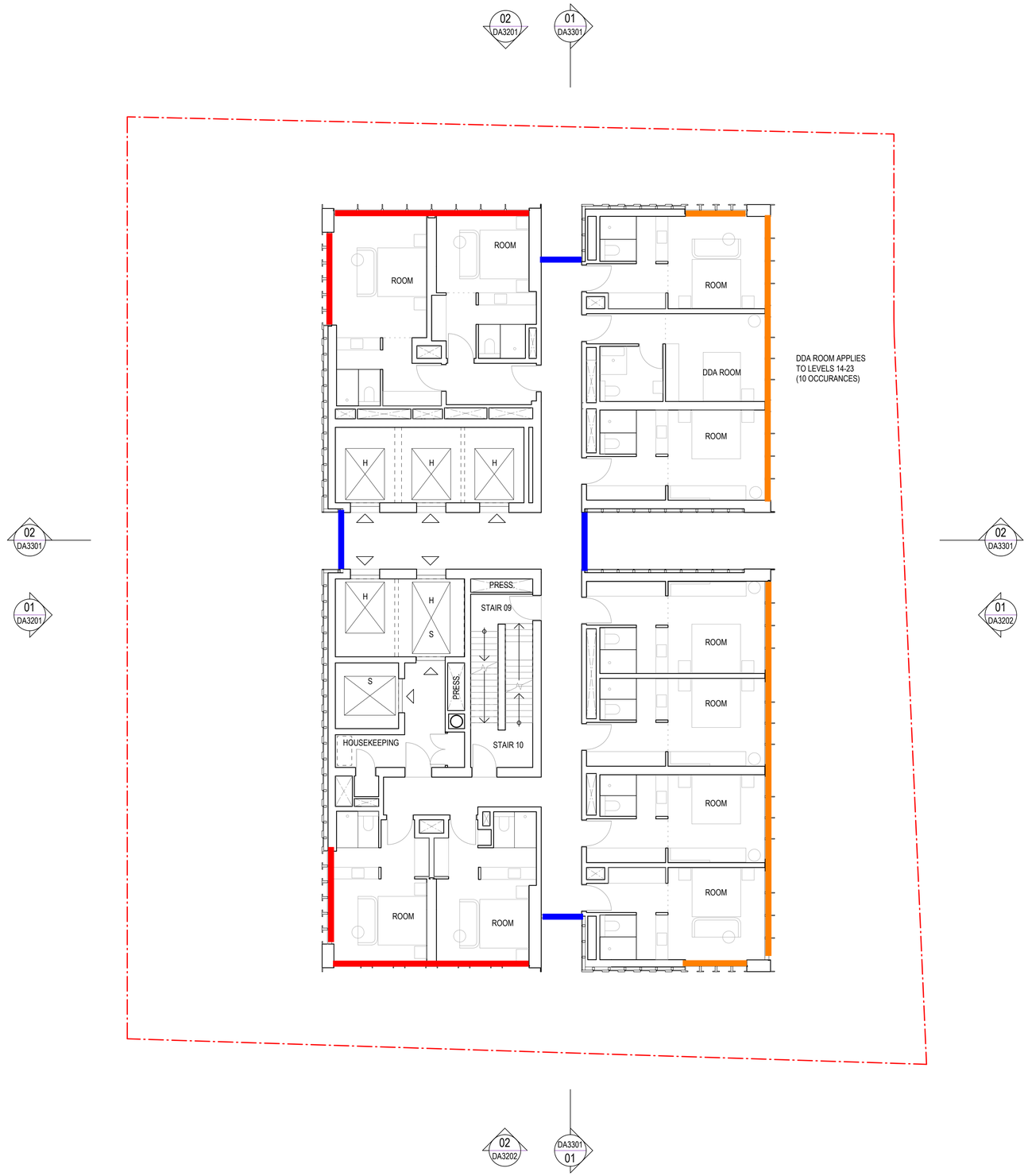
Sheet title
Floor Plan
Level 14-32 - Rooms
Level 24-30

Sheet number **DA2214**
Revision A
Status FOR SSDA

Date generated 7/12/2022 8:58:40 PM Autodesk Docs://121736_4-6 Bligh Street/121247_4-6 Bligh St_BUILDING.rvt

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
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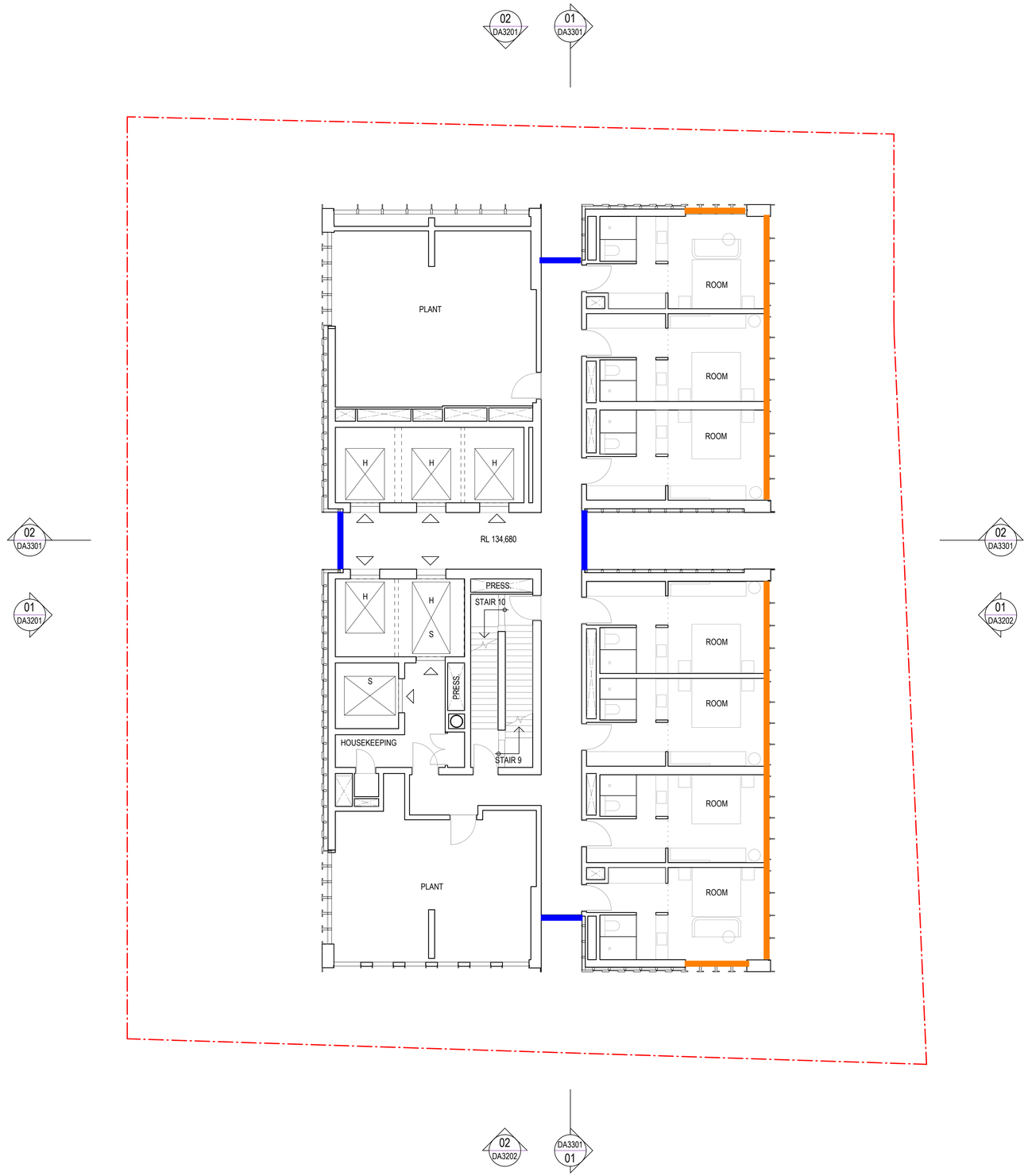
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 14-32 - Rooms
Level 24-30

Sheet number **DA2214**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

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[S] Service Lift
[C] Commercial Lift

Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
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Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

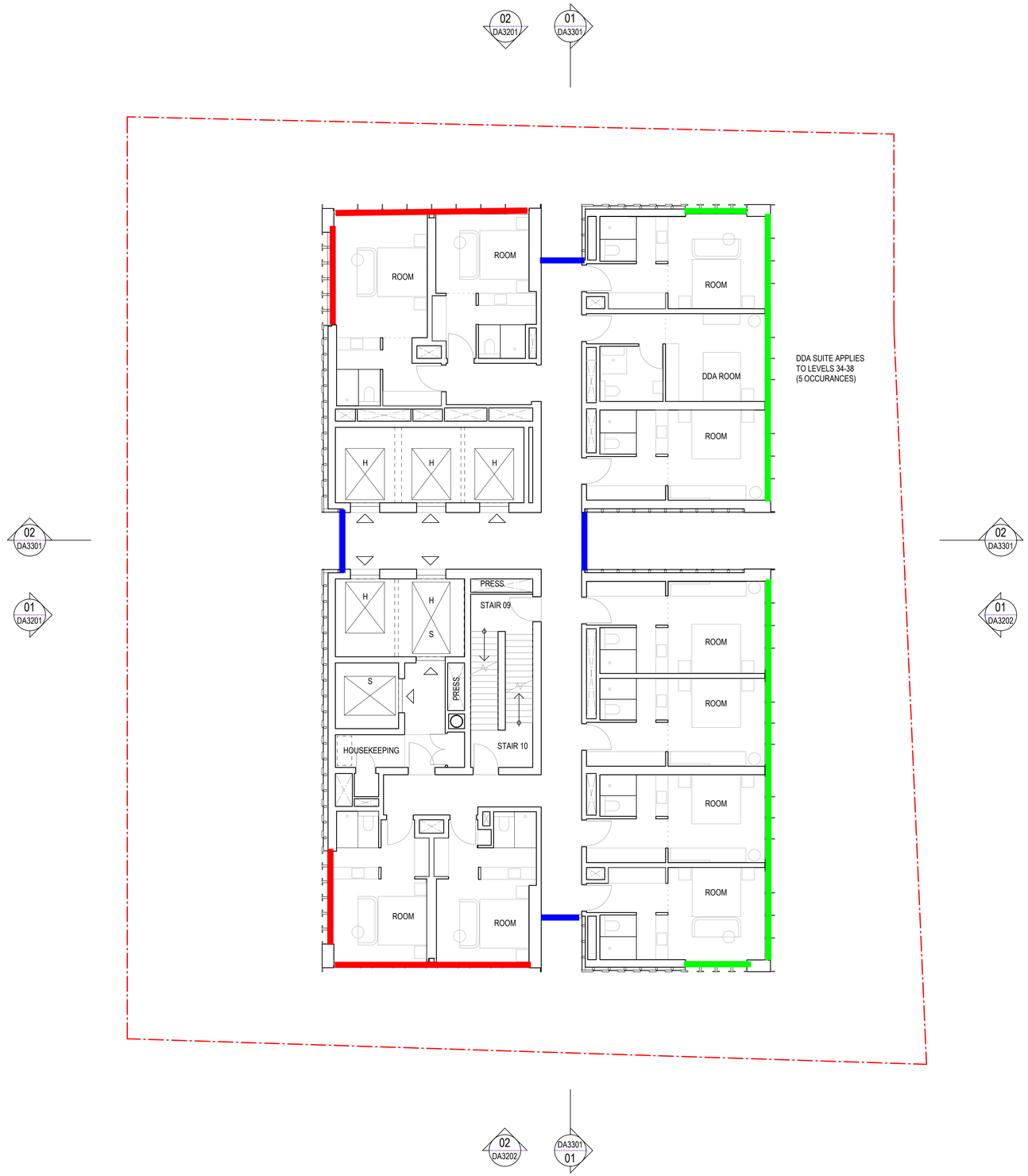
Sheet title
Floor Plan
Level 33 - Plant/Rooms

Sheet number **DA2233**
Revision A
Status FOR SSDA

Date generated 7/12/2022 8:59:06 PM Autodesk Docs://121736_4-6 Bligh Street/121247_4-6 Bligh St_BUILDING.rvt

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

Notes

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[S] Service Lift
[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
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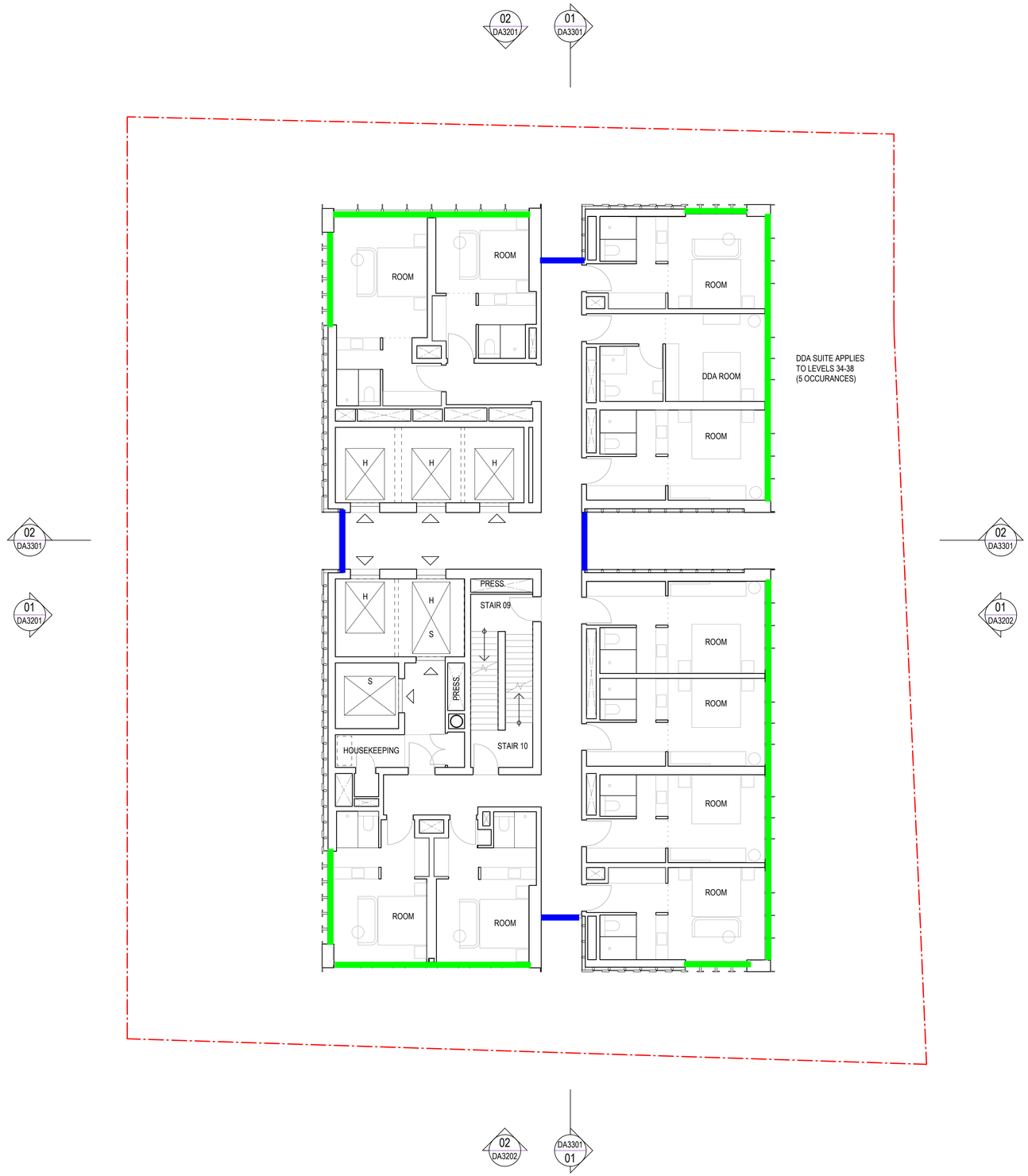
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 34-45 - Rooms
Level 34-35

Sheet number **DA2234**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
W–B™ WOODS BAGOT

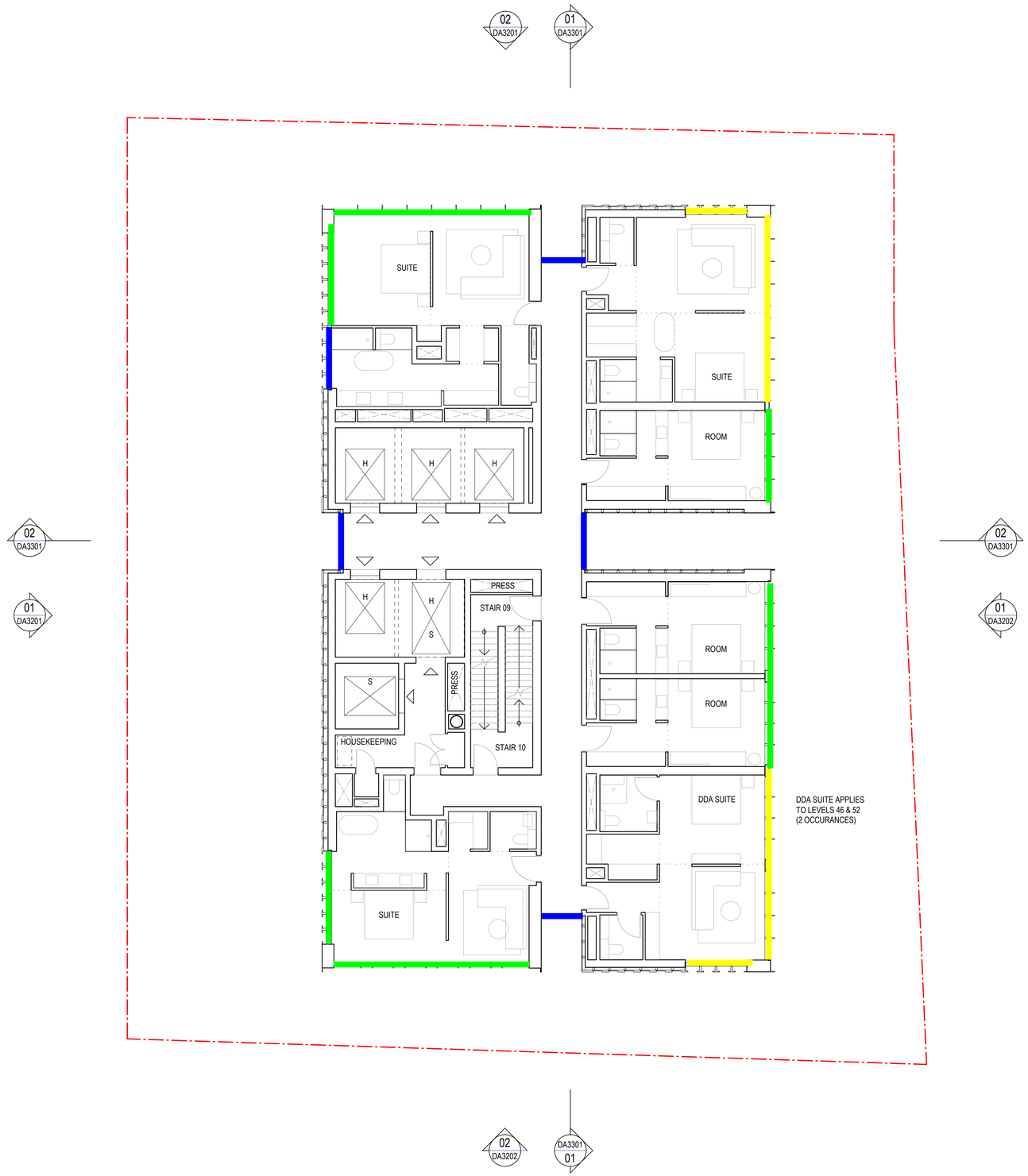
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 34-45 - Rooms
Level 36-45

Sheet number **DA2234**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
W–B™ WOODS BAGOT

Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 46-53 - Suites
Level 46-52

Sheet number **DA2246**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary

Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[S] Service Lift
[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
W–B™ WOODS BAGOT

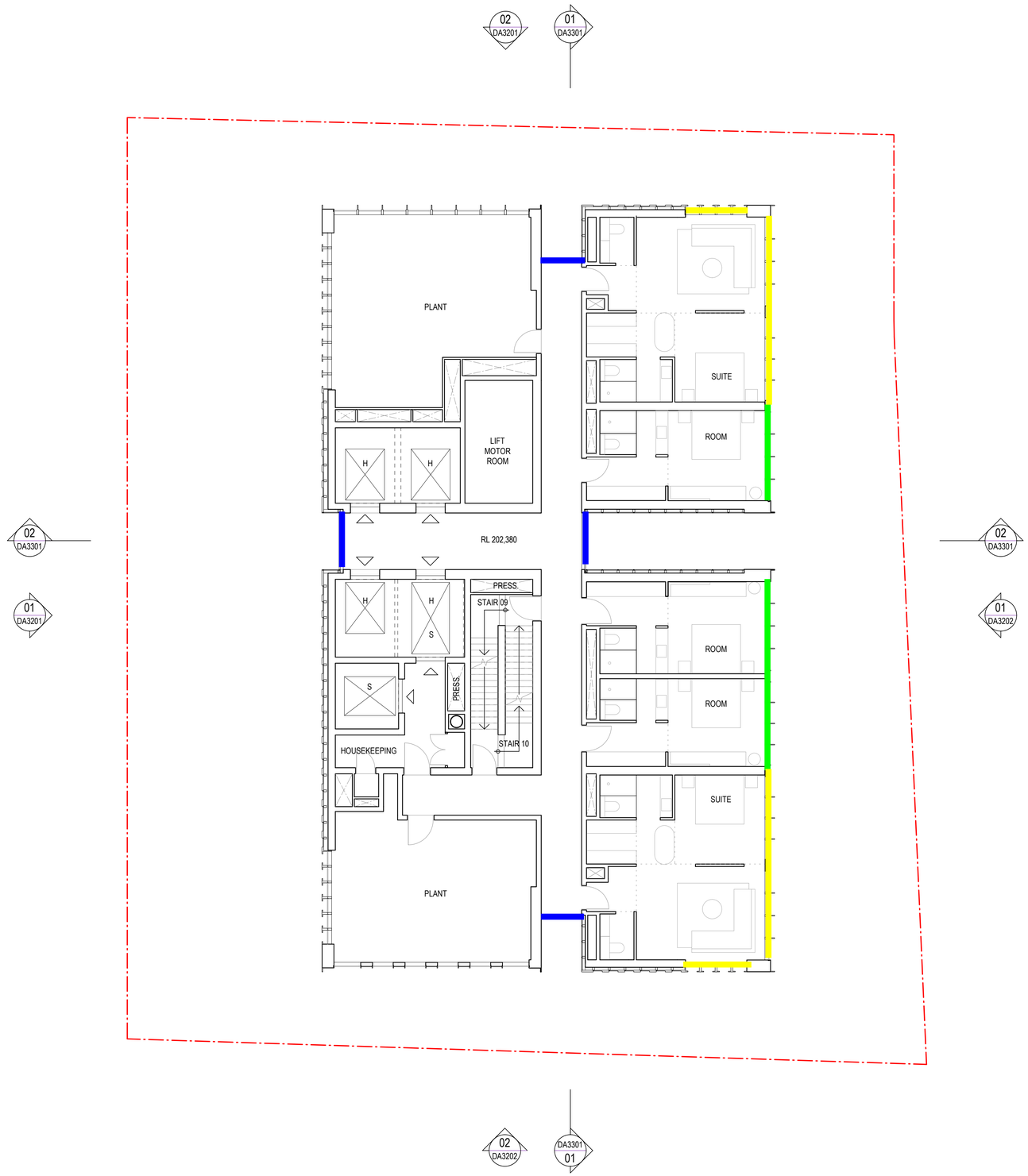
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 46-53 - Suites
Level 53

Sheet number **DA2246**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
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Issuer
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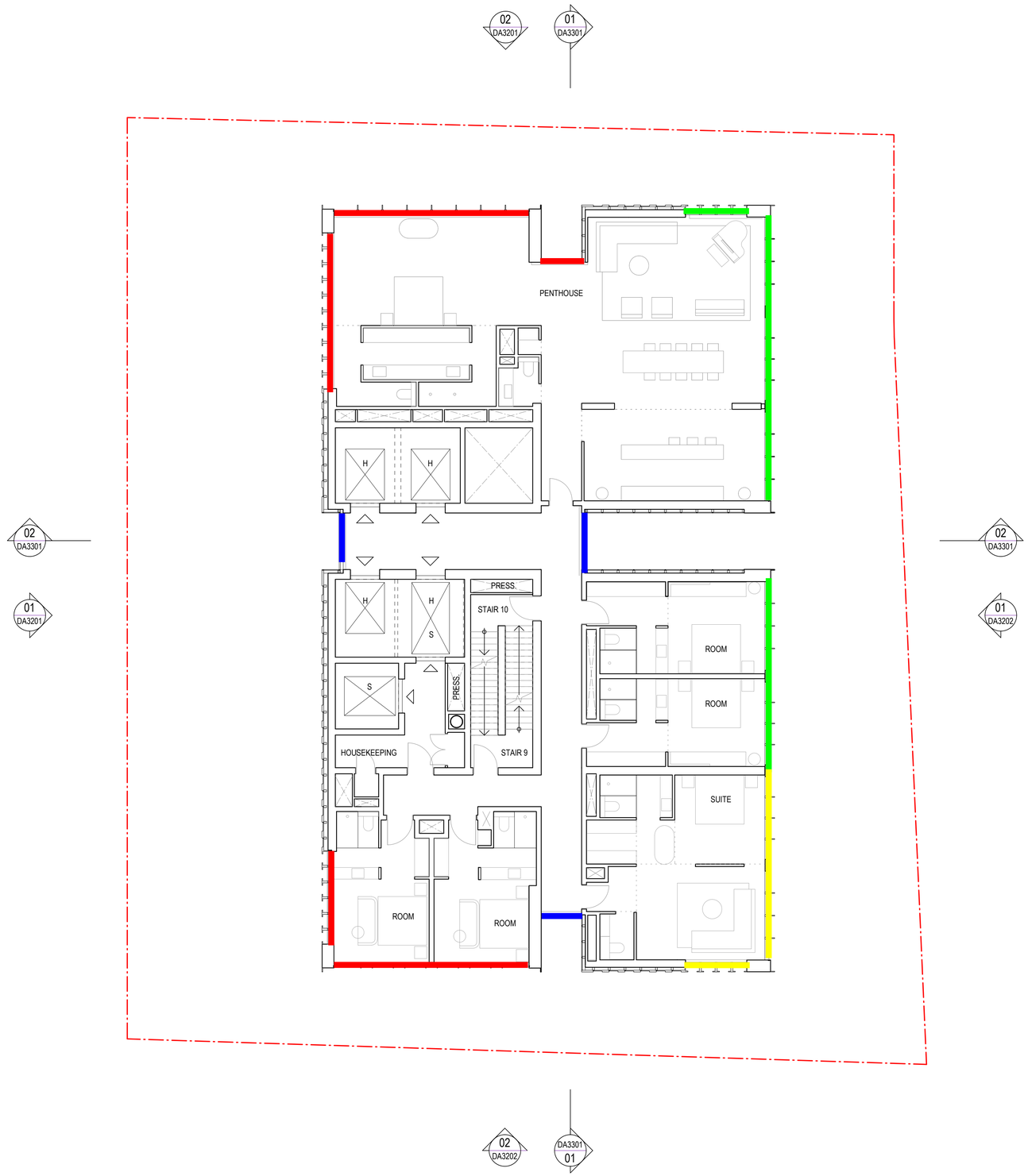
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 54 - Plant/Suites

Sheet number **DA2254**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
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Issuer
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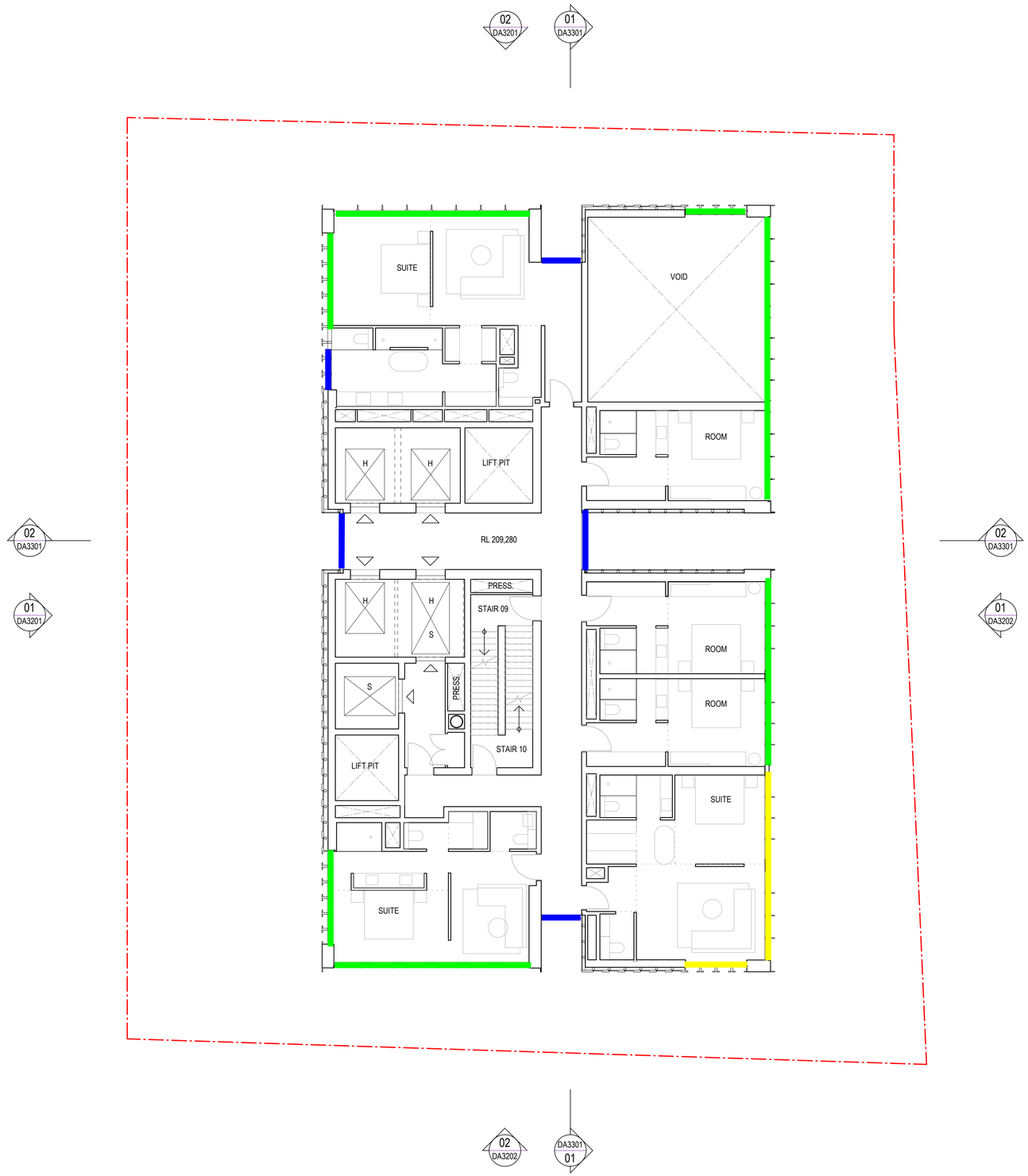
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 55 - Penthouse

Sheet number **DA2255**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
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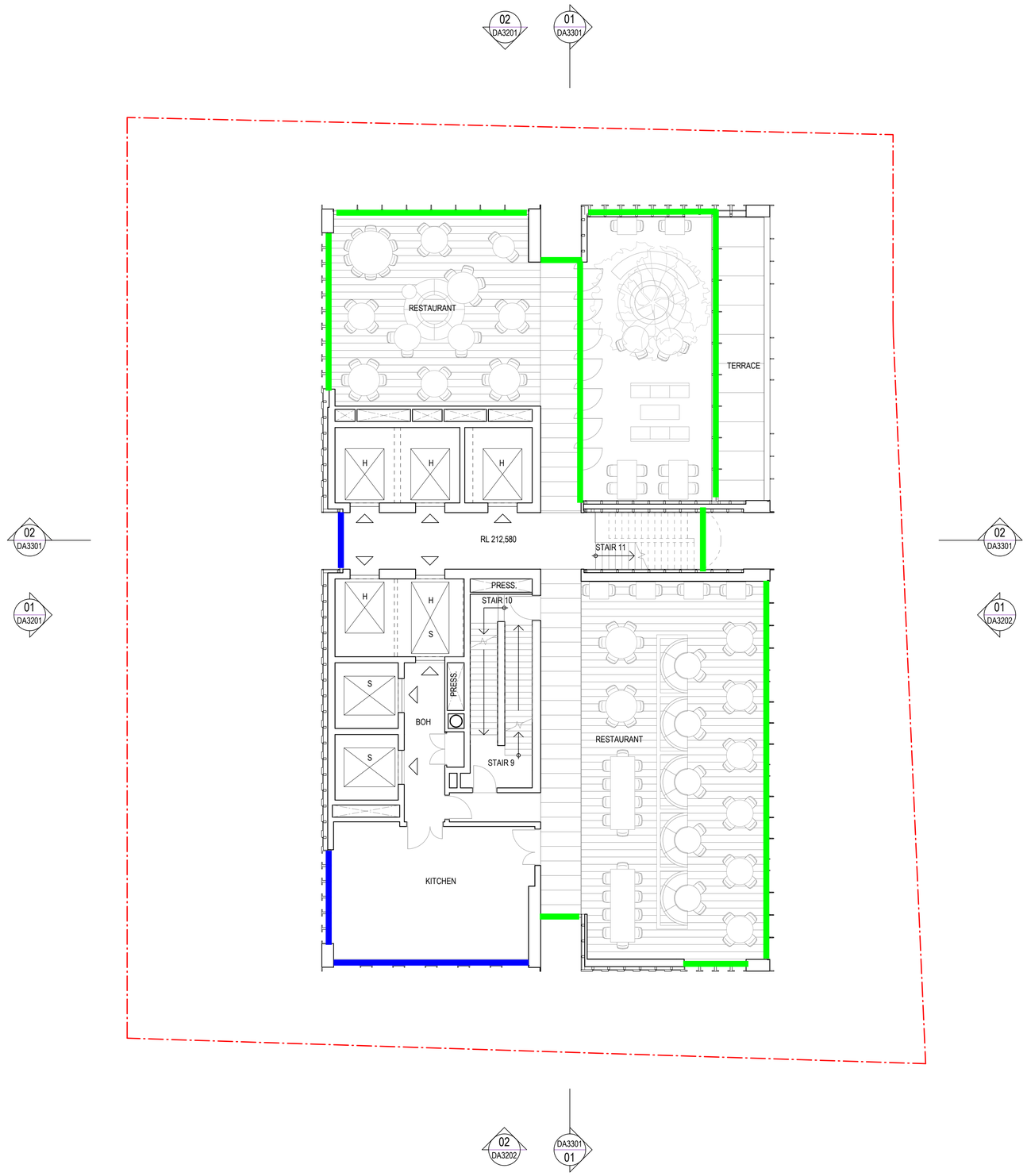
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 56 - Suites

Sheet number **DA2256**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
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Issuer
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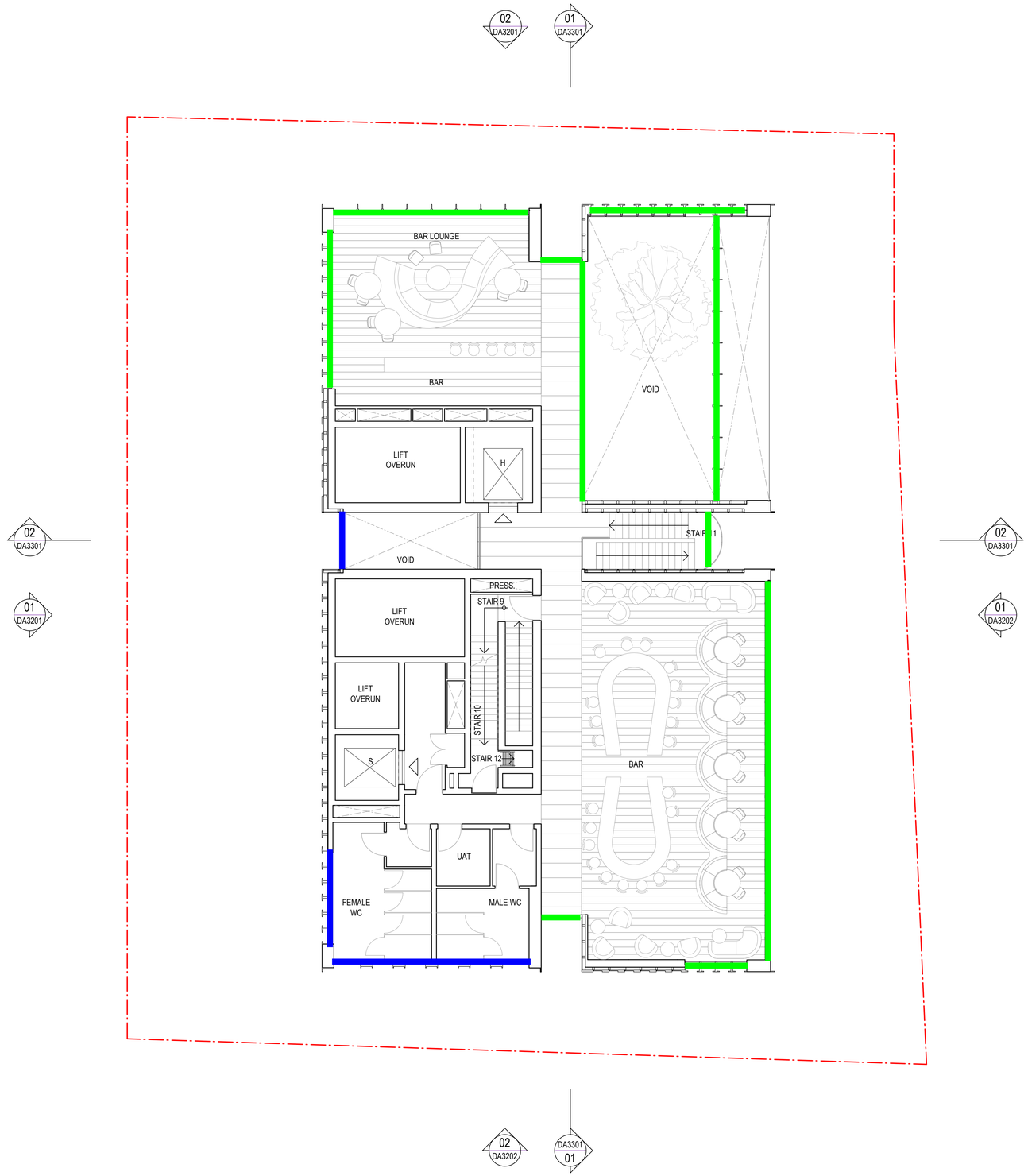
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 57 - Restaurant

Sheet number DA2257
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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[C] Commercial Lift

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Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
W–B™ WOODS BAGOT

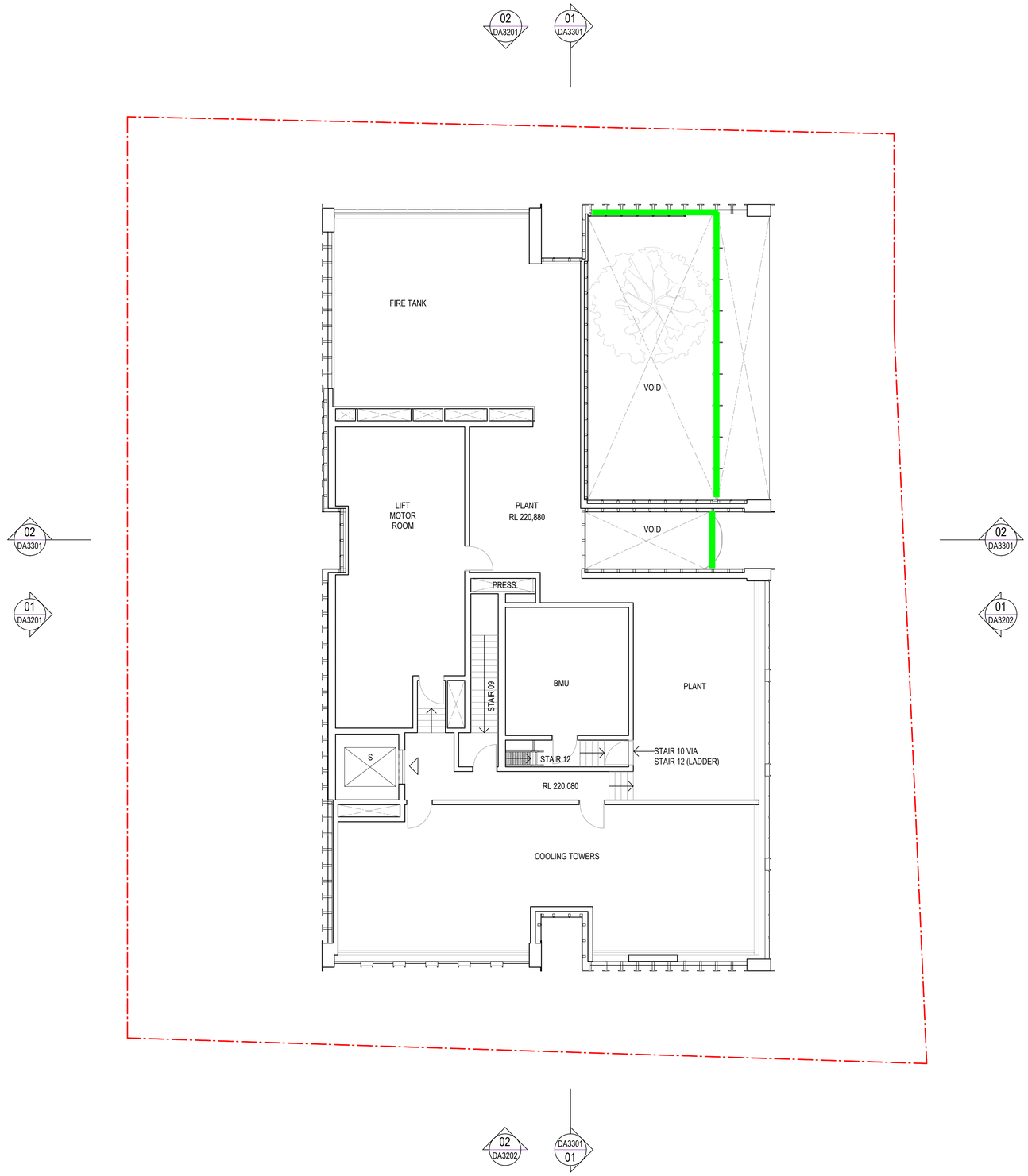
Project number 121736
Size check 25mm
Checked TD
Approved KD
Sheet size A1
Scale 1 : 100

Sheet title
Floor Plan
Level 58 - Bar

Sheet number **DA2258**
Revision A
Status FOR SSDA

PROJECT :	4-6 Bligh Street
PROJECT NUMBER :	301351060
SKETCH TITLE :	Glazing Requirements
DATE :	22/12/2022

Preliminary



Proposed Glazing

- 6 mm glass (Rw 31)
- 8 mm glass + 12 mm air gap + 12 mm glass OR 6 mm glass + 12 mm air gap + 6.38 mm laminated glass (Rw 39)
- 6 mm glass + 12 mm air gap + 10.38 mm laminated glass (Rw 41)
- 6 mm glass + 12 mm air gap + 12.38 mm laminated glass (Rw 42)
- 12 mm glass + 12 mm air gap + 12.5 VLam Hush (Rw 46)

Recent revision history

#	Status	Description	Date
A		SSDA Submission	19.12.22

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LEGEND
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[S] Service Lift
[C] Commercial Lift

Project
4-6 Bligh Street

Client
Holdmark NSW Pty Ltd

Issuer
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Project number
121736

Size check
25mm

Checked TD | Approved KD | Sheet size A1 | Scale 1 : 100

Sheet title
Floor Plan
Level 59 - Plant

Sheet number
DA2259

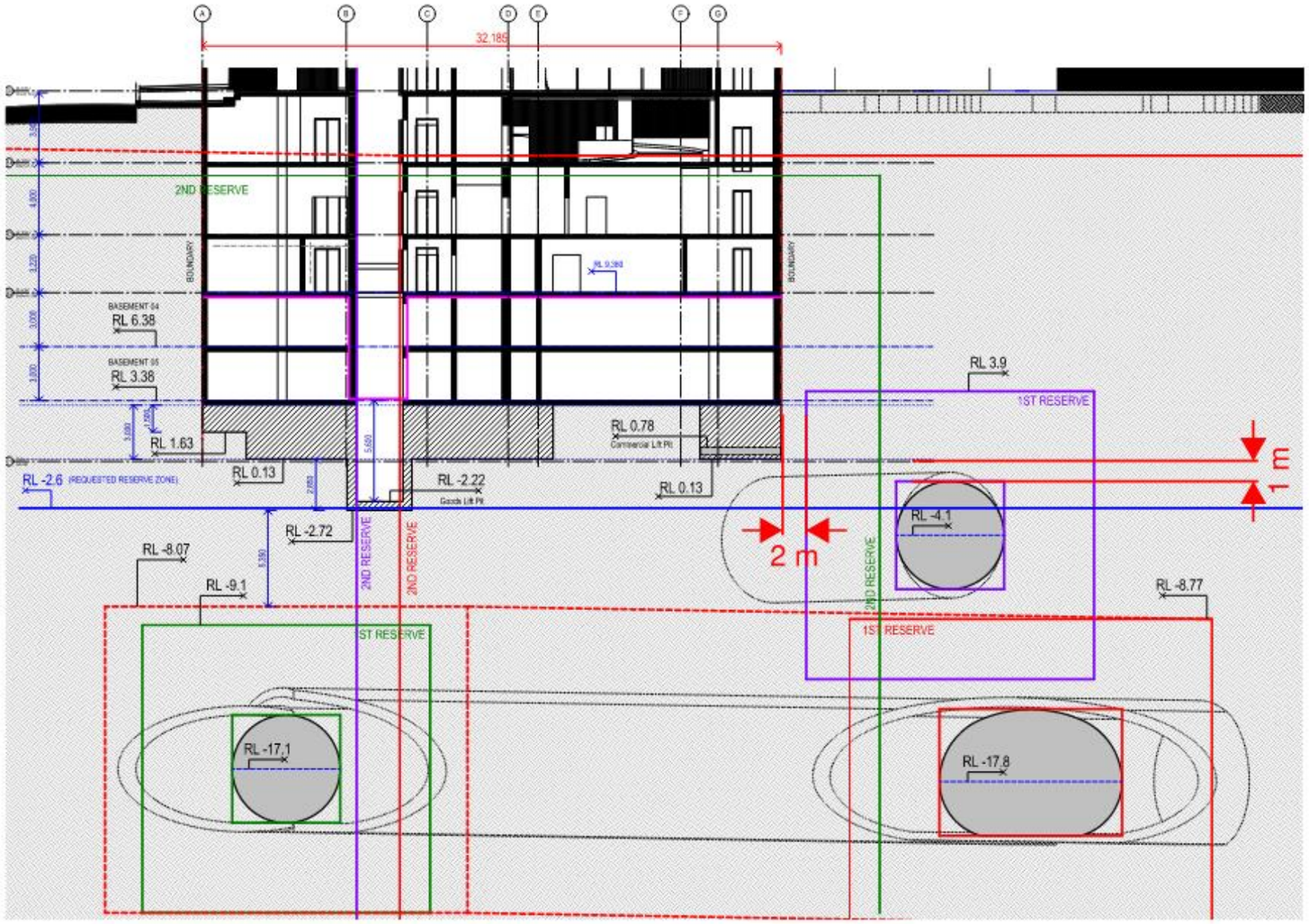
Revision
A

Status
FOR SSDA

Date generated 7/12/2022 9:02:43 PM Autodesk Docs://121736_4-6 Bligh Street/121247_4-6 Bligh St_BUILDING.rvt

Appendix B Sydney Metro Tunnel Location

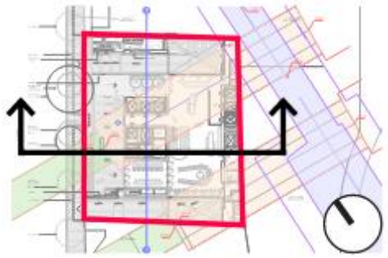
Cross Section - West / East



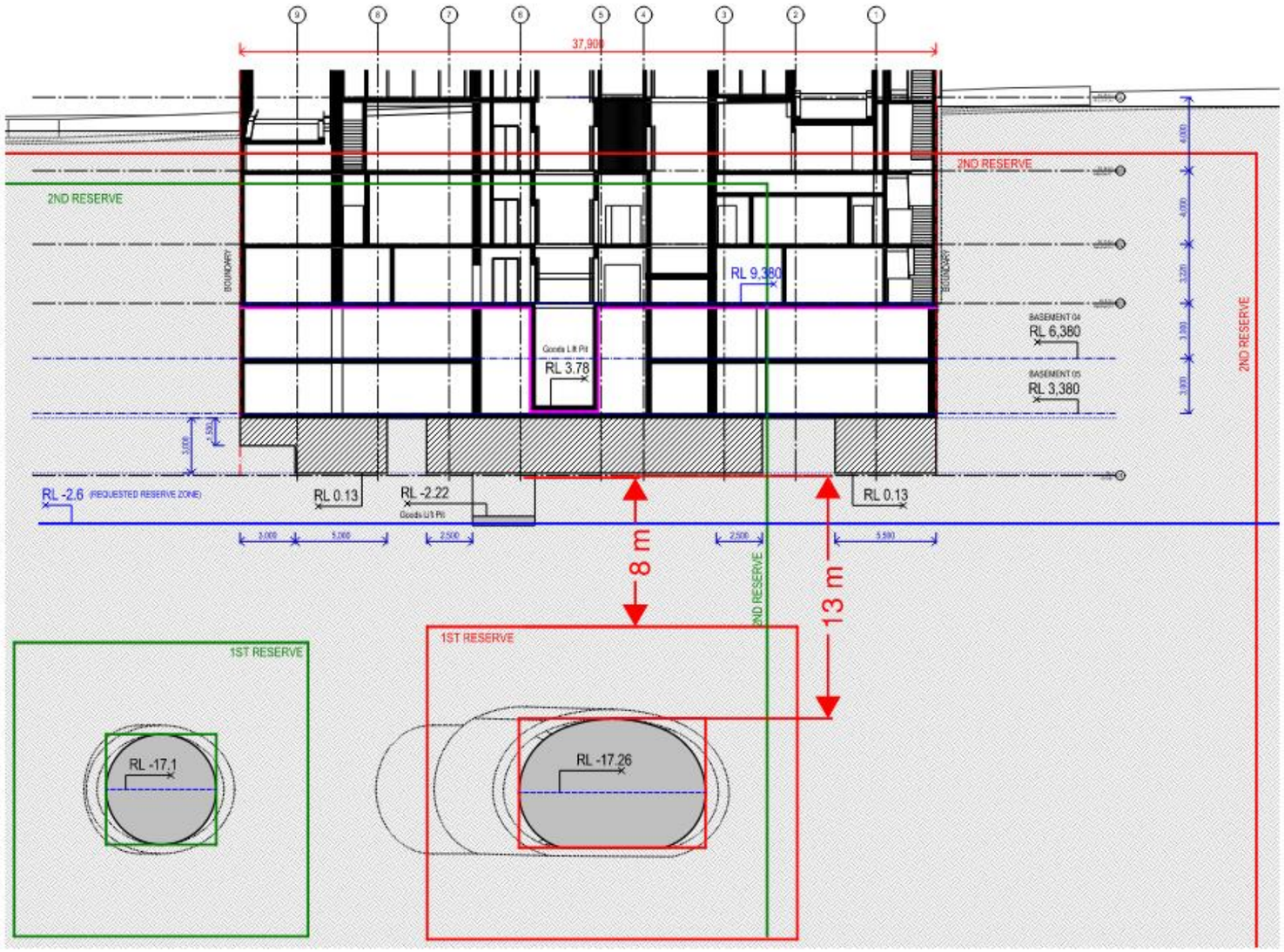
Cross Section - Proposed

Outline of current levels

Rl 9.38 Approved Early Works DA



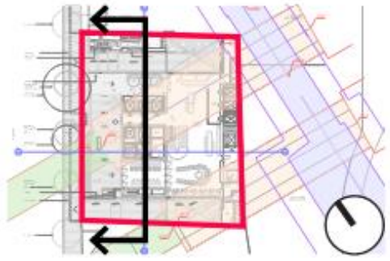
Long Section - North / South



Long Section - Proposed

Outline of current levels

RI 9.38 Approved Early Works DA



w

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Level 6, Building B,
207 Pacific Highway
St Leonards NSW 2065
Tel +61 2 8484 7000

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