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623 Collins Street

Acoustic Assessment

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Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	24/02/2022	20220184.1/2402A/R0/SS	SS	ET	
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4	17/10/2023	20220184.1/1710A/R4/SS	ET		ET

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1 INTRODUCTION

This report presents our acoustic assessment of the proposed development at 623 Collins Street, Melbourne. This assessment has been based on the following documents.

Table 1 – Referenced Documents

Document	Prepared By	Document No.	Revision	Date
Architectural Drawings	Carr	TP-0010, TP-100, TP-101, TP-102, TP-103, TP-104, TP-105, TP-106, TP-107, TP-03B5, TP-03B3, TP-03B2, TP-03B1, TP-0300, TP-0300M, TP-0301, TP-0302, TP-0304, TP-0305, TP-0306, TP-0307, TP-0308, TP-0309, TP-0312, TP-0313, TP-0314, TP-0316, TP-0317, TP-0318, TP-0321, TP-0329, TP-0333, TP-0337, TP-0338, TP-0342, TP-0343, TP-2000, TP-2001, TP-2002, TP-2003, TP-2004, TP-2005, TP-2006, TP-2007, TP-3000, TP-3001, TP-3002, TP-3003, TP-3005	B	28/09/2023

2 PROPOSED DEVELOPMENT

The proposed development is a 43-storey tower over 5 Basement levels at 623 Collins Street, Melbourne. The proposed use of the development is carparking on 5 basement levels with entry from Spencer Street, restaurant, retail and lobbies on ground floor, hotel guestrooms and associated amenities from mezzanine level to level 12, commercial office on levels 13-16, apartment amenities on level 16, apartments from levels 17-41, and mechanical plant on level 42.

Figure 1 below shows the site and its surrounding environment, and noise measurement locations.

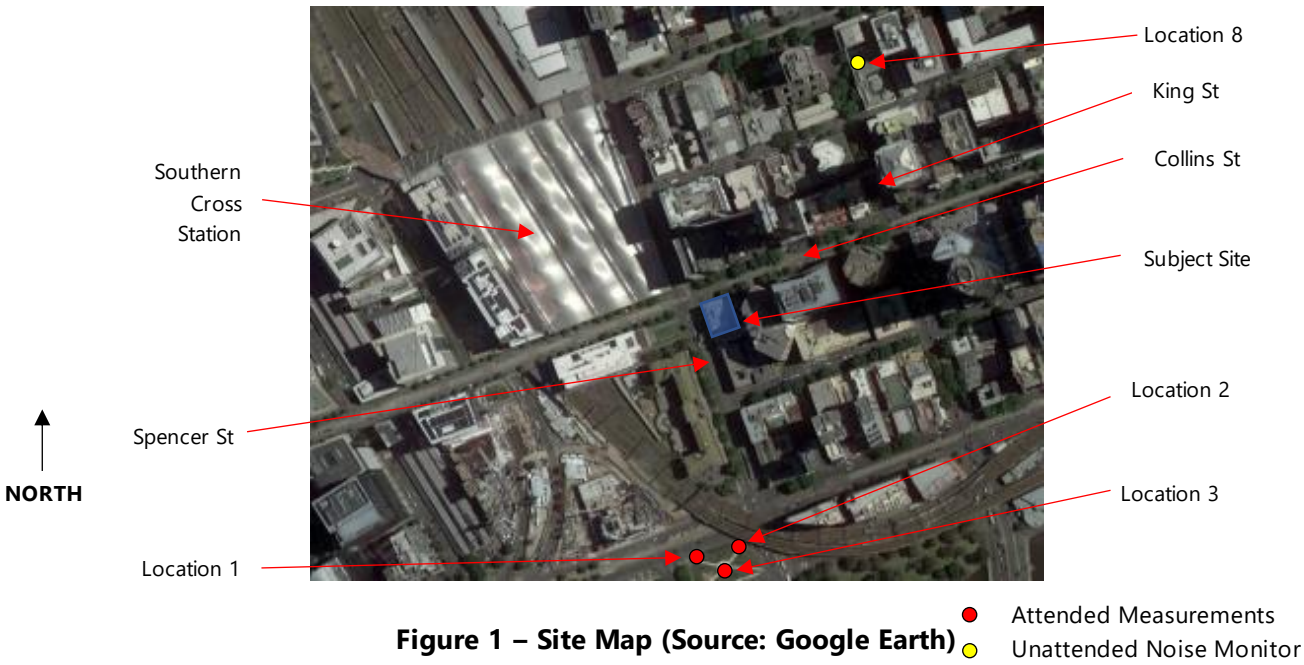


Figure 1 – Site Map (Source: Google Earth)

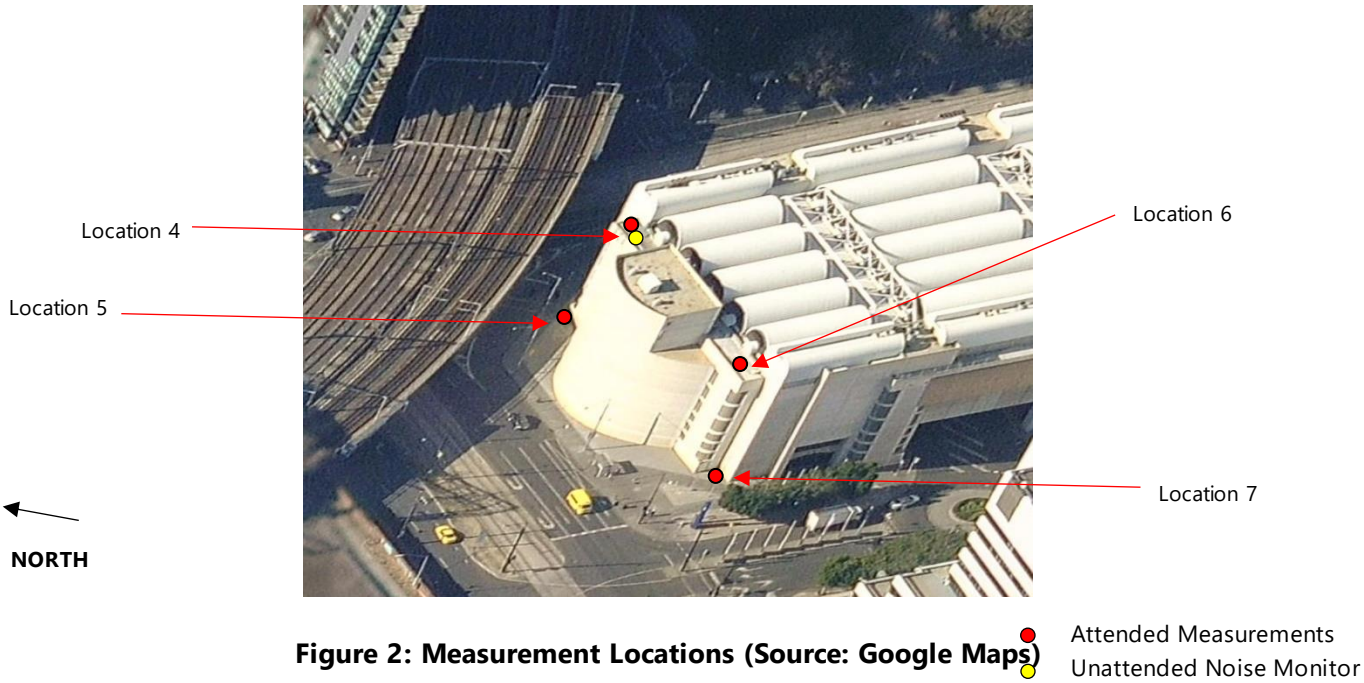


Figure 2: Measurement Locations (Source: Google Maps)

2.1 LOCAL NOISE SOURCES

Review of the site found that noise from traffic on surrounding streets and rail noise from the nearby rail corridor are the dominant local noise sources.

3 ENVIRONMENTAL NOISE DESCRIPTORS

Environmental noise constantly varies in level, due to fluctuations in local noise sources including road traffic. Accordingly, a 15-minute measurement interval is normally utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In the case of environmental noise three principal measurement parameters are used, namely L_{10}, L_{90} and L_{ea}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source depends on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of industrial noise.

The L_1 parameter (or the noise level exceeded for 1% of the time) is used during the night period to assess potential sleep arousal effects due to transient noise sources.

4 ASSESSMENT CRITERIA

The internal noise level criteria for residential apartments and hotel within the proposed development has been established based on the requirements of Standard D16 of Clause 58.04-3 and Australian Standard AS2107:2016.

4.1 STANDARD D16 AT CLAUSE 58.04-3

Standard D16 of Clause 58.04-3 is applicable to apartments and contains the following condition:

To contain noise sources in developments that may affect existing dwellings.

To protect residents from external and internal noise sources.

Standard D16

Noise sources, such as mechanical plants should not be located near bedrooms of immediately adjacent existing dwellings.

The layout of new dwellings and buildings should minimise noise transmission within the site.

Noise sensitive rooms (such as living areas and bedrooms) should be located to avoid noise impacts from mechanical plants, lifts, building services, non-residential uses, car parking, communal areas and other dwellings.

New dwellings should be designed and constructed to include acoustic attenuation measures to reduce noise levels from off-site noise sources.

Buildings within a noise influence area specified in Table D3 should be designed and constructed to achieve the following noise levels:

- *Not greater than 35dB(A) for bedrooms, assessed as an LAeq,8h from 10pm to 6am.*
- *Not greater than 40dB(A) for living areas, assessed LAeq,16h from 6am to 10pm.*

Buildings, or part of a building screened from a noise source by an existing solid structure, or the natural topography of the land, do not need to meet the specified noise level requirements.

Noise levels should be assessed in unfurnished rooms with a finished floor and the windows closed.

Table D3 Noise influence area

Noise Source	***Noise influence area***
Zone interface	
Industry	*300 metres from the industrial 1, 2 and 3 zone boundary*
Roads	
Freeways, tollways and other roads carrying 40,000 Annual Average Daily Traffic Volume	*300 metres from the nearest trafficable lane*
Railways	
Railway servicing passengers in Victoria	*80 metres from the centre of the nearest track*
Railway servicing freight outside Metropolitan Melbourne	*80 metres from the centre of the nearest track*
Railway servicing freight in Metropolitan Melbourne	*135 metres from the centre of the nearest track*

Note: The noise influence area should be measured from the closest part of the building to the noise source.

Decision guidelines

Before deciding on an application, the responsible authority must consider:

- *The design response.*
- *Whether it can be demonstrated that the design treatment incorporated into the development meets the specified noise levels or an acoustic report by a suitably qualified consultant submitted with the application.*
- *Whether the impact of potential noise sources within a development have been mitigated through design, location and siting.*
- *Whether the layout of rooms within a dwelling mitigates noise transfer within and between dwellings.*
- *Whether an alternative design meets the relevant objectives having regard to the amenity of the dwelling and the site context.*

Based on the above, we note the following points:

- The subject site is **not** located within 300 metres of industrial 1, 2 and 3 zone boundaries.
- The subject site **is located** with 300 metres from the roads that carries 40,000 AADT.
    - King Street carries an AADT of 43,000 based on the VicRoads Open Data Hub website and is located approximately 180 metres east of subject site.
- The subject site **is located** within 135 metres of the centre of the nearest track of railway servicing freight trains.
    - The nearest rail corridor is the city loop which is located approximately 120 metres west of subject site.

Based on the above, the Clause 58.04-3 criteria will apply to the apartments with the rail corridor as indicated in the Table 2 below. It is understood Clause 58.04-3 requirements are not applicable to hotel guest rooms.

Table 2 – Internal Noise Criteria - Apartments

Location	Internal Design Noise Level[1,2]
Living Rooms	40 dB(A) $L_{eq(16hr)}$ (6am – 10pm)
Bedrooms	35 dB(A) $L_{eq(8hr)}$ (10pm – 6am)

Note 1 – With external windows and doors closed
Note 2 – Noise Level within unfurnished room with finished floor

4.2 AUSTRALIAN STANDARDS AS 2107:2016

It is understood Clause 58.04-3 is not applicable to hotel guest rooms. Criteria for guest rooms have been established based on Australian Standards AS2107:2016.

Australian Standard AS/NZS2107:2016 "Recommended Design Sound Levels and Reverberation Times for Building Interiors" sets out recommended design sound levels for residential developments depending on locality to minor or major roads. Table 3 below details the criteria for all the hotel rooms.

Table 3 – Internal Noise Criteria – Hotel Guest Rooms

Location	Required Maximum Internal Noise Level[1]	
	Day (7am – 10pm) dB(A) L_{eq}	Night (10pm – 7am) dB(A) L_{eq}
Guestrooms	-	35 - 40

Note 1 - Noise level within furnished room ready for occupation.

4.3 SLEEP DISTURBANCE CRITERIA - RAIL

In Victoria there are currently no statutory standards to assess maximum noise level intrusion into residential developments from rail generated noise. In lieu of this the following New South Wales rail noise intrusion criteria has been adopted.

Rail Infrastructure Corporation (RIC) and State Rail Authority (SRA) nominated criteria for residential development in their publication 'Interim Guidelines for Councils – Consideration of Rail Noise and Vibration in the Planning Process' dated 2003 which are accessed internally with windows closed. Table 4 below details the maximum internal noise level criteria for rail noise suitable for this development.

Table 4 – Internal Noise Level Criteria – Rail Noise – Apartments and Guestrooms

Location	Required Internal Noise Levels
Bedrooms and Guestrooms	55 L_{Max} dB(A)[1]

Note 1 – The dB(A) L_{max} value is derived as the maximum noise level not exceeded by 95% of train pass-by events.

4.4 SCHEDULE 1 TO CLAUSE 37.04 CAPITAL CITY ZONE – MELBOURNE PLANNING SCHEME

Schedule 1 to Clause 37.04 Capital City Zone of the Melbourne Planning Scheme states the following:

> *'An application to construct a building or to construct or carry out works for a residential use must be accompanied by an Acoustic Assessment which must show how the proposal meets the following requirements:*
>
> - *Habitable rooms of new dwellings adjacent to high levels of external noise should be designed to limit internal noise levels to a maximum of 45dB in accordance with relevant Australian Standards for acoustic control.'*

Based on the above the following criteria are applicable to this development.

Table 5 – Internal Noise Level Criteria

Location	Required Maximum Internal Noise Levels
Habitable Rooms	45dB(A) $L_{eq(1\ hour)}$[1]

Note 1 - Noise level within furnished room ready for occupation.

It is noted that this criteria is less stringent than those nominated under Standard D16 of Clause 58.04-3.

4.5 PROJECT CRITERIA

Based on the above the following internal traffic/train noise level criteria are recommended for the development to achieve the objective of protecting residents and guests from external noise sources.

Table 6 – Internal Noise Criteria

Location	Required Internal Noise Level[1]
Guestrooms Night-time (10pm – 7am)	35 – 40 dB(A)[2] $L_{eq(1\ hour)}$ 55dB(A)[2] L_{max} (rail noise) (10pm – 7am)
Apartment Bedrooms Night-time (10pm – 6am)	35 dB(A)[3] $L_{eq(8hr)}$ 55dB(A)[2] L_{max} (rail noise) (10pm – 6am)
Apartment Living Rooms	40 dB(A)[3] $L_{eq(16hr)}$ (6am – 10pm)

Note 1 – With external windows and doors closed

Note 2 – Noise level within furnished room ready for occupation

Note 3 – Noise Level within unfurnished room with finished floor

5 NOISE LEVEL MEASUREMENTS

5.1 TRAFFIC/TRAIN NOISE MEASUREMENTS

Attended and unattended train noise measurements were conducted around the Crowne Plaza in 2011. Additional attended measurements were conducted in 2018 and again in 2020 to supplement train noise measurements conducted in 2011. Unattended traffic noise measurements were conducted for King Street in 2020. A 3D Soundplan™ model of the subject site was prepared using this data to determine predicted noise levels at the façade.

5.2 MEASUREMENT LOCATIONS

Noise measurement locations are indicated in Figures 1 and 2 and detailed below.

- Attended train noise measurements were taken on the 10 October 2011 and supplementary measurements were undertaken during the afternoon peak traffic periods on the 24 July 2017 and 25 July 2017.
- The unattended noise monitor (train) was installed on Crowne Plaza rooftop between 5 October 2011 and 11 October 2011.
- Additional measurements were conducted on 15 August 2018 and 17 June 2020.

5.3 MEASUREMENT EQUIPMENT

A Norsonic 140 Sound Level Meter and a Rion NL42 Sound Analyser were used for manned noise measurements. The analyser was set to A-weighted measurements and fast response time and was calibrated before and after the measurements using a Rion NC74 calibrator with no significant drift detected.

An Acoustic Research Laboratories Ngara and ARL-315 noise monitor was used for un-attended noise measurements. The noise monitor was set to A-weighted fast response time and 15-minute statistical noise intervals. The monitors were calibrated at the start and end of the measurement period with a Rion NC-74 calibrator. No significant drift was noted.

5.4 MEASURED NOISE LEVELS

The noise levels measured on site are detailed below.

Table 7 – Unattended Traffic/Train Noise Measurement Levels – $L_{eq,1hr}$

Location	Date	Noise Level $L_{eq\ (1hr)}$ dB(A)
Roof top of Crowne Plaza, approximately 12m from train line – Location 4	October 2011	70

*Note: measurements were conducted in free field and do not contain façade reflection.

Table 8 - Unattended Traffic/Train Noise Measurement Levels – $L_{eq,16/8hr}$

Location	Measured Noise Levels	
	Day (7am – 10pm) dB(A)$L_{eq,\ 16hr}$	Night (10pm – 7pm) dB(A)$L_{eq,\ 8hr}$
Location 1	70	65

*Note: measurements were conducted in free field and do not contain façade reflection

Table 9 – Attended Traffic/Train Noise Measurement Levels

Location	Date	Time	Noise Level L_{eq} dB(A)
1	24/07/17	6.02pm to 6.17pm	67
	25/07/17	4.03pm to 4:18pm	68
		4.20pm to 4.35pm	70
	17/06/2020	8:30am to 8:45am	71
2	24/07/17	5.15pm to 5.30pm	71
		5.30pm to 5.45pm	71
3	17/06/2020	8:12am – 8:27am	71
4	10/10/11	8.55am to 9.25am	70
5	10/10/11	10.38am to 11.08am	73
6	10/10/11	10.06am to 10.36am	71
7	10/10/11	9.29am to 9.59am	67

*Note: measurements were conducted in free field and do not contain façade reflection

6 EVALUATION OF NOISE INTRUSION

Internal noise levels will primarily be as a result of noise transfer through the façade glazing as this is relatively light building element that offer less resistance to the transmission of sound. Walls that are proposed to be heavy masonry elements will not require upgrading.

The predicted noise levels through the façade are discussed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to external noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

Glazing/façade treatment was determined based on the following:

- Predicted noise level at the façade of the site
- It was assumed that the guestrooms were carpeted and furnished
- Transmission loss of façade element.

In all cases, the selected glazing type will reduce internal noise levels to the criteria nominated in section 4 of this report with external windows and doors closed.

6.1 RECOMMENDED GLAZING

The following table list the recommended glazing assemblies for this project to achieve the requirements regarding external noise intrusion. Refer Appendix 1 for markup of typical floor. All openable windows and external doors listed are required to be fitted with acoustic seals. The glazing thicknesses recommended are typical only and will be finalised during the detailed design stage of the development and do not consider other requirements such as structural, safety or other non-acoustic requirements. These additional considerations may require the glazing thickness to be increased beyond the acoustic requirement which would be acceptable acoustically.

Table 10 – Recommended Glazing

Facade	Designated Rooms	Glazing requirement	Acoustic seals
North	Guest Rooms	Heavy weight IGU (nominal 6/12/10.38IGU to 8/12/12.76)[1]	Yes
	Apartments	Heavy weight IGU (nominal 6/12/10.38IGU to 8/12/12.76)[1]	Yes
East	Guest Rooms	Heavy weight IGU (nominal 6/12/10.38IGU to 8/12/12.76)[1]	Yes
	Apartments	Heavy weight IGU (nominal 6/12/10.38IGU to 8/12/12.76)[1]	Yes
West	Guest Rooms	Heavy weight IGU (nominal 6/12/10.38IGU to 8/12/12.76)[1]	Yes
	Apartments	Heavy weight IGU (nominal 6/12/10.38IGU to 8/12/12.76)[1]	Yes
South	Guest Rooms	Heavy weight IGU (nominal 6/12/10.38IGU to 8/12/12.76)[1]	Yes
	Apartments	Heavy weight IGU (nominal 6/12/10.38IGU to 8/12/12.76)[1]	Yes

Note 1: Final glazing thickness to be determined based on final layout, final window size, façade construction and selected window systems and shall be selected to comply with the nominated criteria.

6.2 ROOF / CEILING

Concrete roof construction will satisfactorily ameliorate external noise intrusion.

6.3 EXTERNAL WALLS

External walls composed of concrete or masonry elements would not require upgrading acoustically. Lightweight wall elements will be designed to ensure compliance with the nominated criteria. Any openings in the façade (for mechanical services etc.) will need to be designed to ensure external noise transfer complies with the criteria nominated above.

7 MECHANICAL PLANT AND EQUIPMENT SERVING THE DEVELOPMENT AND NON-RESIDENTIAL USES ON THE DEVELOPMENT SITE

Plant and equipment selections/design have not yet been finalised. To ensure amenity for future residents and nearby noise sensitive receivers is preserved, mechanical plant and equipment shall be designed to ensure compliance with the EPA Publication 1826.4. In addition, where domestic air conditioning units are installed, they should comply with the EPA Noise Control Guidelines (Publication 1973). Treatment is to be determined during the detailed design phase of the project.

To ensure amenity for future residents and nearby noise sensitive receivers is preserved, non-residential uses including hotel and apartment amenities shall be designed and operated to ensure compliance with EPA Publication 1826.4 Part 1 (and Part 2 where applicable). Treatment and operational controls are to be determined during the detailed design phase of the project.

8 INTERNAL ACOUSTICS / SEPARATION BETWEEN APARTMENTS/GUESTROOMS

Walls and floors separating apartments/guestrooms and separating apartments/guestrooms from common areas/services/lifts etc. shall be designed to ensure compliance with the requirements of Part F5 of the BCA/NCC 2019. Construction/detailing will be determined during the detailed design stage of the project to ensure the required separation is achieved.

9 CONCLUSION

This report details our acoustic assessment for the proposed development located at 623 Collins Street, Melbourne. Provided the acoustic treatment recommendations detailed in Section 6 are implemented, compliance with the assessment criteria in Section 4 will be achieved.

We trust this information is satisfactory. Please contact us should you have any further queries.

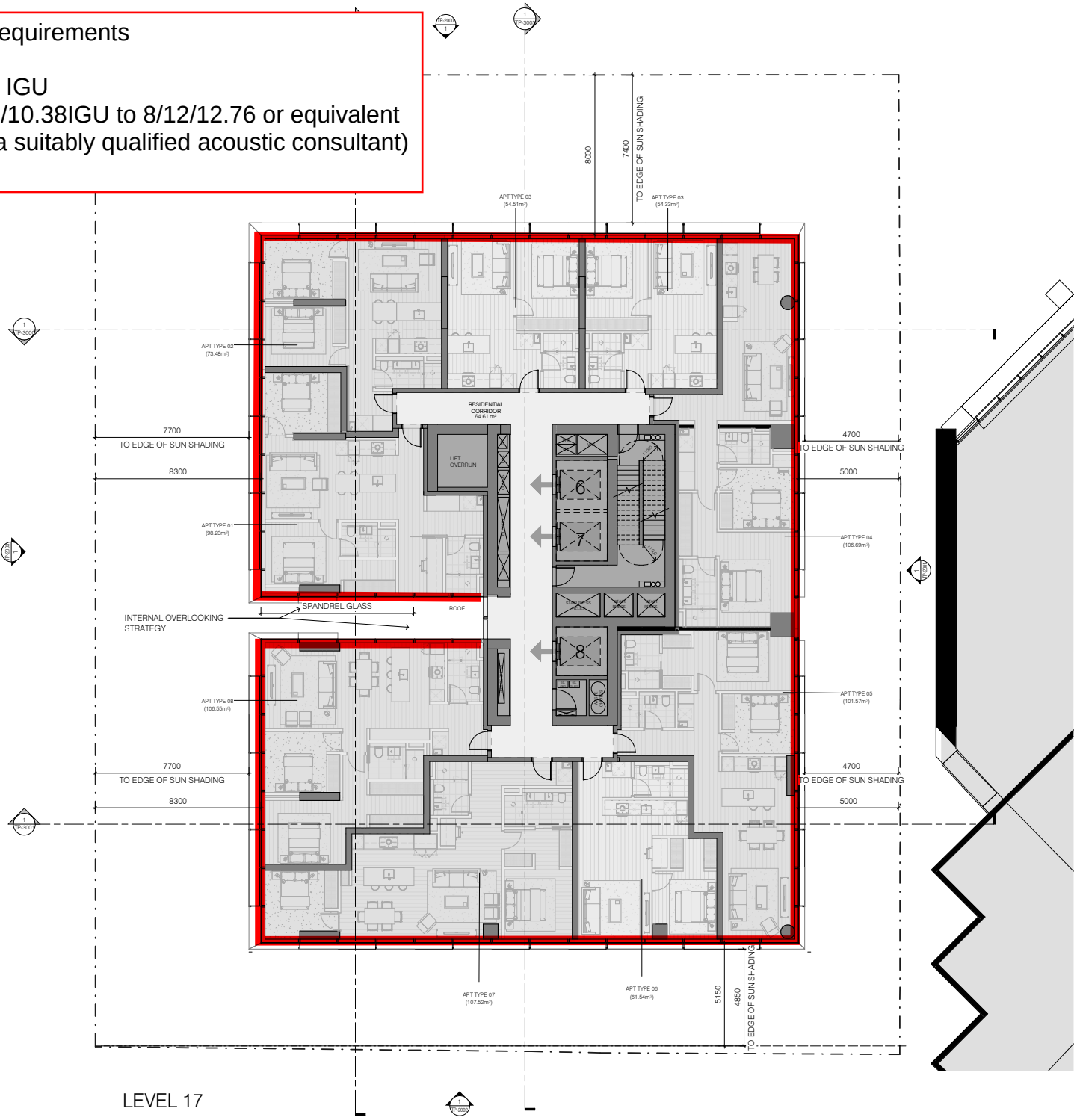
Yours faithfully,

Acoustic Logic Pty Ltd
Stanley Sinatra

APPENDIX 1 – TYPICAL RESIDENTIAL FLOOR FAÇADE MARKUP

Acoustic Glazing Requirements

- Heavy weight IGU
  (nominal 6/12/10.38IGU to 8/12/12.76 or equivalent approved by a suitably qualified acoustic consultant)



LEVEL 17

NOT FOR CONSTRUCTION

GENERAL NOTES

LIFT SUMMARY

1. COMMERCIAL & ROOFTOP BAR
2. HOTEL GOODS
3. HOTEL GOODS
4. HOTEL GUESTS, BALLROOM & WELLNESS
5. HOTEL GUESTS, BALLROOM & WELLNESS
6. RESIDENTIAL, PASSENGER & GOODS
7. RESIDENTIAL PASSENGER
8. RESIDENTIAL PASSENGER

APARTMENT SUMMARY

- 1 BEDROOM
- 2 BEDROOM
- 3 BEDROOM
- PENTHOUSE

Rev	Date	Chkd	Reason for Issue
B	28/09/2023		REVISED DESIGN ISSUED FOR COORDINATION
A	24/04/2023		TOWN PLANNING APPLICATION

Based on Drawings Received:

NORTH

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31 Flinders Lane
Melbourne VIC
3000 Australia

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Project	607 - 623 Collins Street Melbourne
Title	FLOOR PLAN - LEVEL 17
Date	11/28/22
Project No	21062
Scale @ A1	1 : 100
Dwg No	TP-0317
Drawn By	CE
Chkd	DB
Rev	B