Attachment A8

Noise Impact Statement

8-24 Kippax Street Surry Hills

CANVA Office Building Minor Additions Planning Proposal Noise Impact Statement

Canva Pty Ltd

Report number: 230530 – Canva Office Base Build PP NIA - R0 .docx
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1 INTRODUCTION

This Noise Impact Assessment has been prepared by Pulse White Noise Acoustics (PWNA) on behalf Canva (the applicant) in support of a Planning Proposal (PP) submitted to the City of Sydney Council (CoSC). This PP relates to the proposed minor rooftop additions at 8-24 Kippax Street, Surry Hills (the site).

This PP is for the minor rooftop additions which include increased building height and FSR, and comprise of:

- Enclosing and converting the current level 10 roof terrace into an internal function room
- Constructing a new level 11 on top of the level 10 function room.
- Relocate current level 10 external terrace to the new level 11.
- Ancillary works, including site services.

The function room and new terrace will not increase the number of office spaces as it is specifically designed for inhouse functions, events and entertaining.

This PP statement refers to previous noise surveys and established noise criteria undertaken for the site by PWNA. This statement also addresses the potential for noise impacts from the operation of the minor additions to the rooftop, as well as potential noise impacts from existing noise sources within the vicinity of the site from surrounding noise sources.

The development will be assessed against relevant statutory regulations and guidelines including the *Sydney Development Control Plan (DCP) 2012,* Australian / New Zealand Standard *AS/NZS 2107:2016 Acoustics - Recommended design sound levels and reverberation times for building interiors*, and the acoustic requirements of the Environment Protection Authority's (EPA) *Noise Policy for Industry (NPI)*.

1.1 Relevant Guidelines and Reference Documents

The guidelines applicable to this assessment include:

- *Sydney Development Control Plan (DCP) 2012 - Part 4 - Section 4.2.3.11 – Acoustic Privacy;*
- *Australian / New Zealand Standard AS/NZS 2107:2016 Acoustics - Recommended design sound levels and reverberation times for building interiors;*
- *NSW Noise Policy for Industry* 2017 (NPI)

This assessment has been based on and references the following Planning Proposal documentation including:

- Previous Noise Impact Assessment for the 8-24 Kippax Street site prepared by Pulse White Noise Acoustics
- Architectural PP package prepared by Cox Architects

1.2 Site Location and Nearby Sensitive Receivers

The project site is located at 8 – 24 Kippax Street, Surry Hills, NSW 2010.

The nearest sensitive receivers to the site have been identified below.

Receiver 1: A mixed use commercial and retail building to the south-west of the site at the corner of Elizabeth and Kippax Street. The site is formally described as Lot DP 89004.

Receiver 2: Aurora Rooftop Hotel, A commercial building to the west of the site at 324 Elizabeth Street, Surry Hills. The site is formally described as Lot DP 86543 & DP 1042078.

Receiver 3: Commercial building to the west of the site at 316 – 302 Elizabeth Street, Surry Hills. The sites are formally described as part of Lot DP 33877.

Receiver 4: Residential receivers to the west of the site at 25 – 15 Terry Street, Surry Hills. The sites are formally described as part of Lot DP 33877.

Receiver 5: Education and retail buildings located at the corner of Elizabeth and Foveaux Street, Surry Hills. The site is formally described as Lot DP 854813.

Receiver 6: Education building with retail shops surrounding education spaces. Located to the north of the site at 1 – 51 Foveaux Street, Surry Hills. Formally described as Lot DP 1228703.

Receiver 7: Residential and commercial building to the east of the site at 26 – 44 Kippax Street, Surry Hills. Described as lot SP 57612.

Receiver 8: Commercial building to the east of the site at 46 Kippax Street, Surry Hills. Described as Lot DP 578501.

Receiver 9: Commercial building located to the south-east of the project site at 2 Holt Street, Surry Hills. Formally described as Lot DP 86372.

A map depicting the site location, unattended and attended monitoring locations, and the nearest receivers is provided in Figure 1 below.

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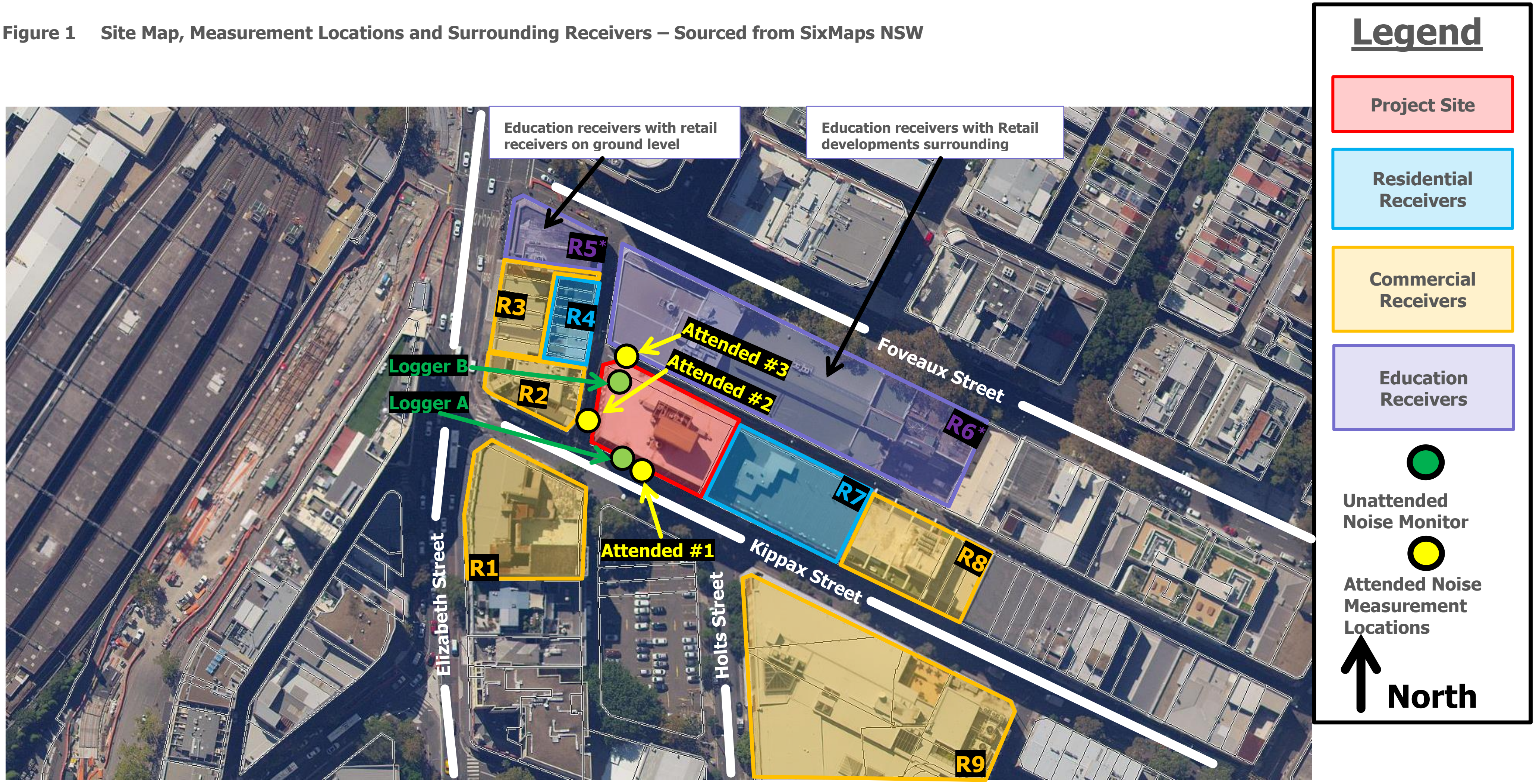
Figure 1 Site Map, Measurement Locations and Surrounding Receivers – Sourced from SixMaps NSW



2 EXISTING ACOUSTIC ENVIRONMENT

As stated above, PWNA has previously undertaken noise survey of the subject site for development application noise impact assessment and this statement refers to the noise survey data from that previous assessment. This section of the report is a summary of the noise survey data adopted for the planning proposal. Refer to the previous PWNA noise impact assessment report for details of the acoustic survey.

2.1 Summary of Unattended Noise Monitoring Results

Table 1 Measured Ambient Noise Levels corresponding to the NPI's Assessment Time Periods

Measurement Location	Daytime[1] 7:00 am to 6:00 pm		Evening[1] 6:00 pm to 10:00 pm		Night-time[1] 10:00 pm to 7:00 am	
	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)
Logger A – Level 1, Kippax Street (See Figure 1)	55	62	52	60	49	58
Logger B – Roof top (north-western corner) (See Figure 1)	60	63	58	62	56	61

Note 1: For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 7:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 8:00 am

Note 2: The L_{A90} noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.

Note 3: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

Table 2 Measured Ambient Noise Levels corresponding to the EPA Road Noise Policy (RNP) 2011 Time Periods

Measurement Location	Measured Noise Level	
	Daytime[1] 7:00 am to 10:00 pm	Night-time[1] 10:00 pm to 7:00 am
	$L_{Aeq\,(15hour)}$[1] (dBA)	$L_{Aeq\,(9hour)}$[1] (dBA)
Logger A – Level 1, Kippax Street (See Figure 1)	61	59
Logger B – Roof top (north-western corner) (See Figure 1)	63	61

Note 1: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

2.2 Attended Noise Measurements

Table 3 Results of the Attended Noise Survey

Measurement Location	Date and Time	Measured Noise Level (dBA)		Comments
		L_{A90} (15-min)[1]	L_{Aeq} (15-min)[2]	
#1 Kippax Street (see Figure 1)	8:00pm to 8:30pm, 5th October 2023	58	61	Noise levels impacting the site dominated by music and patron noise at the Aurora Hotel.
#2 Corner of Kippax Street and Terry Street (see Figure 1)	8:00pm to 8:30pm, 5th October 2023	58	61	Noise levels impacting the site dominated by music and patron noise at the Aurora Hotel.
#3 Sophia Street (see Figure 1)	8:00pm to 8:30pm, 5th October 2023	53	55	Noise levels impacting the site dominated by mechanical services noise from nearby buildings.
#4 Project Site Roof top	10:00am to 11:00am, 29th September 2023	57	58	Noise levels driven by nearby buildings mechanical services, with occasional train / light rail noise from Central Station.
#5 Level 9 – North-western corner (Internal)	10:00am to 11:00am, 29th September 2023	44	48	Noise levels driven by nearby buildings mechanical services, with occasional train / light rail noise from Central Station.
#6 Level 9 – North-western corner (outside window)	10:00am to 11:00am, 29th September 2023	62	63	Noise levels driven by internal mechanical services noise, with occasional train / light rail noise from Central Station.
#7 Level 3 – North-western corner (Internal)	10:00am to 11:00am, 29th September 2023	44	63	Noise levels driven by internal mechanical services noise, with additional train / light rail noise from Central Station and road traffic noise.
#8 Level 3 – North-western corner (outside window)	10:00am to 11:00am, 29th September 2023	60	61	Noise levels driven by internal mechanical services noise, with occasional train / light rail noise from Central Station / road traffic noise.
#9 Level 3 – North-western corner (outside window) – Delivery truck pass-by	10:00am to 11:00am, 29th September 2023	62	67	Noise levels dominated by passing by delivery truck (Woolworths Metro)
#10 Level 2 – Western corner (Internal)	10:00am to 11:00am, 29th September 2023	45	46	Noise levels driven by internal mechanical services noise, with occasional train / light rail noise from Central Station / road traffic noise.
#11 Level 2 – Western corner (outside window)	10:00am to 11:00am, 29th September 2023	60	63	Noise levels driven by internal mechanical services noise, with additional train / light rail noise from Central Station and road traffic noise.

Note 1: The L_{A90} noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.

Note 2: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

2.3 Calculated L_{Aeq} Noise Levels at Future Facades (Noise Intrusion)

In determining the required construction for the future building envelope, contributing L_{Aeq} noise levels from surrounding roads to each future façade need to be determined. Utilising the 15-minute interval difference between the attended measurement and the unattended monitors, the predicted façade noise levels are presented in Table 4 below.

Table 4 Predicted Noise Levels at Future Façades

Prediction Location	Predicted Façade Noise Level $L_{Aeq\ (Period)}$ [1] (dBA)			
	Daytime (7:00am-10:00pm)		Night-time (10:00pm-7:00am)	
	$L_{Aeq\ (Whole\ Period)}$	$L_{Aeq\ (1\ Hour)}$	$L_{Aeq\ (Whole\ Period)}$	$L_{Aeq\ (1\ Hour)}$
Northern Façade (facing Sophia Street)	63	65	61	62
Southern Façade (facing Kippax Street)	61	64	59	61
Western Façade (facing Terry Street)	63	65	61	63

Note 1: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

Note 2: Façade noise levels are constant between ground – roof level. This has been verified by external attended measurements at façade levels (see Section 0 above).

3 ACOUSTIC AND VIBRATION CRITERIA

This section of the report is a summary of the previously established noise criteria adopted for the planning proposal. Refer to the previous PWNA noise impact assessment report for detail information of the established criteria.

3.1 Noise Intrusion Criteria

External noise intrusion into the building will generally be via the building envelope (External wall, glazing or external roof). The design of the building envelope should be such that the requirements listed below are achieved.

Table 5 AS2107 Design Sound Levels for Different Occupancies

Type of Occupancy/Activity	Design sound level range ($L_{Aeq,t}$)
Office buildings	
Corridors and lobbies	45 – 50
Function area	40 - 45
Roof top external private recreation areas	50 - 55

Generally, where the final noise levels are within +/- 2 dB of the specified level given above, the design criteria will be considered met. Both the upper and lower limits will need to be satisfied especially where privacy is important or where noise intrusion to be avoided.

3.1.1 Project Airborne Noise Requirements

Based on the details included in the section above, the project internal noise levels requirements are summarised in Table 6 below.

Table 6 Project Airborne Internal Noise Levels Requirements

Room Type	Internal Environmental Noise Levels (Traffic and Airborne Train Noise) – dBA $L_{Aeq\ (period)}$
Office buildings	
Corridors and lobbies	50 dB(A) $L_{Aeq\ (period)}$
Townhall (function areas)	45 dB(A) $L_{Aeq\ (period)}$
Roof top private recreation areas	55 dB(A) $L_{Aeq\ (period)}$

3.2 Noise Emission Criteria (Operational Criteria)

Noise emissions from the operation of the development impacting on adjacent land users are outlined below. Noise emissions expected from the use of the site include building services noise and activity noise associated with communal areas.

3.2.1 City of Sydney Council Development Control Plan (DCP) 2012

Noise emissions from the use of the site are not covered in the City of Sydney Council Development Control Plan 2012. However, typical conditions of consent that are adopted in relation to permitted noise emissions from a project site have been shown below. Typically, these are in line with the requirements of the NSW EPA *Noise Policy for Industry (NPI) 2017*.

3.2.2 NSW EPA Noise Policy for Industry (NPI) 2017

The intrusive and amenity criteria for industrial noise emissions, derived from the measured data, are presented in Table 7. These criteria are nominated for the purpose of determining the operational noise limits for mechanical plant associated with the development which can potentially affect noise sensitive receivers.

For each assessment period, the lower (i.e., the more stringent) of the amenity or intrusive criteria are adopted, which are shown in bold text.

Table 7 External noise level criteria in accordance with the NSW NPI

Location	Time of Day [1]	Project Amenity Noise Level, $L_{Aeq, period}$ (dBA)	Measured $L_{A90, 15 min}$ (RBL) [2] (dBA)	Measured $L_{Aeq, period}$ Noise Level (dBA)	Intrusive $L_{Aeq, 15 min}$ Criterion for New Sources (dBA)	Amenity $L_{Aeq, 15 min}$ Criterion for New Sources (dBA)
Residential Receivers (Logger A)	Day	55	55	62	60	**58**
	Evening	45	52	60	57	**53**[4]
	Night	40	49	58	54	**51**[4]
Residential Receivers (Logger B)	Day	55	60	63	65	**58**
	Evening	45	58	62	63	**55**[4]
	Night	40	56	61	61	**54**[4]
Education Receivers	Noisiest 1-hour period when in use	30	N/A	N/A	N/A	**33**
Commercial Receivers	When in use	60	N/A	N/A	N/A	**63**

Note 1: For Monday to Saturday, Daytime 7:00 am – 10:00 pm; Night-time 10:00 pm – 7:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 10:00 pm; Night-time 10:00 pm – 8:00 am.

Note 2: L_{A90} Background Noise or Rating Background Level.

Note 3: Project Noise Trigger Levels are shown in bold and underlined.

Note 4: Where the measured L_{Aeq} noise levels are more than 10 dB higher than the Project Amenity Criterion, then the 15 minute Amenity Noise Criteria is equal to the measured $L_{Aeq,period}$ noise levels minus 10 dBA + 3 dB to convert from the measurement "period" to a 15 minute criteria.

3.2.2.1 Maximum Noise Level Event Assessment

Based on the measured noise levels outlined in section 2.1 the resulting maximum noise level event requirements are:

Logger A:

- 49 dBA $L_{A90\ (10pm\text{-}7am)}$ + 5 dBA = **54 dBA $L_{Aeq(15\text{-}mins)}$**, which is greater than 40 dBA and therefore the 54 dBA will be adopted.
- 49 dBA $L_{A90\ (10pm\text{-}7am)}$ + 15 dBA = **64 dBA L_{AFMax}**, which is greater than 52 dBA and therefore the 64 dBA L_{AFMax} will be adopted.

Logger B:

- 56 dBA $L_{A90\ (10pm\text{-}7am)}$ + 5 dBA = **61 dBA $L_{Aeq(15\text{-}mins)}$**, which is greater than 40 dBA and therefore the 48 dBA will be adopted.
- 56 dBA $L_{A90\ (10pm\text{-}7am)}$ + 15 dBA = **71 dBA L_{AFMax}**, which is greater than 52 dBA and therefore the 71 dBA L_{AFMax} will be adopted.

3.3 City of Sydney Council Entertainment Noise Requirements

The previously established criteria for Entertainment Noise set out in the City of Sydney Council DCP are reproduced below. These criteria are applicable for the assessment of patron and music noise emissions from the potential food and beverage areas located on ground level of the proposed development and the rooftop private bar area.

Table 8 City of Sydney Council Noise – Entertainment Conditions Criteria

Parameter	Octave Band Centre Frequency, Hz, dB								
	31.5	63	125	250	500	1k	2k	4k	8k
Day Period (7.00am to midnight) – External Criteria – Logger A									
Measured L_{90}	65	62	60	58	59	57	52	44	31
Criteria L_{eq}	70	67	65	63	64	62	57	49	36
Day Period (7.00am to midnight) – Internal Criteria – Logger A									
Measured L_{90}	65	62	60	58	59	57	52	44	31
Criteria L_{eq}	*60**	52	50	48	49	47	42	34	21
Night Period (Midnight to 7.00am) – External Criteria – Logger A									
Measured L_{90}	61	58	56	54	55	53	48	40	27
Criteria L_{eq}	61	58	56	54	55	53	48	40	27
Night Period (Midnight to 7.00am) – Internal Criteria – Logger A									
Measured L_{90}	61	58	56	54	55	53	48	40	27
Criteria L_1	*60**	48	46	44	45	43	38	30	17
Day Period (7.00am to midnight) – External Criteria – Logger B									
Measured L_{90}	69	70	67	64	61	58	52	44	32
Criteria L_{eq}	74	75	72	69	66	63	57	49	37
Day Period (7.00am to midnight) – Internal Criteria – Logger B									
Measured L_{90}	69	70	67	64	61	58	52	44	32
Criteria L_{eq}	*60**	60	57	54	51	48	42	34	22
Night Period (Midnight to 7.00am) – External Criteria – Logger B									
Measured L_{90}	69	65	63	61	57	55	50	41	29
Criteria L_{eq}	69	65	63	61	57	55	50	41	29
Night Period (Midnight to 7.00am) – Internal Criteria – Logger B									
Measured L_{90}	69	65	63	61	57	55	50	41	29
Criteria L_1	*60**	55	53	51	47	45	40	31	19

*Note * - Criteria value determined by the threshold of hearing curve for the octave band frequency.*
Internal criteria assume opened facades at the receivers hence internal background noise levels inside receiver will be governed by the external background noise level.

4 OPERATIONAL ACOUSTIC ASSESSMENT

In addressing all the criteria shown above, each component of the development is assessed and presented below.

4.1 Summary of Measured/Predicted Noise Level and Building Envelope Acoustic Criteria

The results of the monitoring that provides the façade noise levels of the proposed building are presented in Table 4. The relevant noise intrusion criterion for land-based noise intrusion sources are summarised in Table 9 below together with the monitored external noise levels and the predicted noise levels on the relevant building façades.

Table 9 Summary of Facade Noise Levels and Relevant Assessment Criteria

Facade Location	Document/ Guideline/ Standard	Day Time [1 2] (dBA)		Night Time [1 2] (dBA)	
		$L_{Aeq\ (Whole\ Period)}$	$L_{Aeq\ (1\ Hour)}$	$L_{Aeq\ (Whole\ Period)}$	$L_{Aeq\ (1\ Hour)}$
Measured/Predicted Noise Levels					
Northern Façade (facing Sophia Street)		63	65	61	62
Southern Façade (facing Kippax Street)		61	64	59	61
Western Façade (facing Terry Street)		63	65	61	63
Noise Criteria Applicable (All Façades)					
Corridors and lobbies	50 dB(A) LAeq (period)				
Function area	45 dB(A) LAeq (period)				
Roof top Terrace	55 dB(A) LAeq (period)				

Note 1: For Monday to Sunday, Daytime 7:00 am – 10:00 pm; Night-time 10:00 pm – 7:00 am.
Note 2: For internal noise level criteria which are presented as a range, compliance is determined based on the highest level in the range.

4.2 Building Envelope Assessment

This section of the report details the recommended building constructions to ensure the required acoustic criteria detailed in this report will be achieved.

4.2.1 Glazing Recommendations

The recommended sound transmission loss requirements required to satisfy the specified internal noise level criteria outlined above are summarised in Table 10 below. Please note that these recommendations are also based on the floor details shown in the architectural drawings of the proposed development.

Table 10 Recommended External Glazing

Location	Spaces	Minimum Glazing System Rating Requirements [1]	Indicative Construction [1]
Northern Façade (facing Sophia Street)	All areas	Rw (C;Ctr): 35 (0;-3)[3]	Windows with min. construction: IGU system of 6 mm float / 12 mm air gap / 10 mm float
Southern Façade (facing Kippax Street)	All areas	Rw (C;Ctr): 35 (0;-3)[3]	Windows with min. construction: IGU system of 6 mm float / 12 mm air gap / 10 mm float
Western Façade (facing Terry Street)	All areas	Rw (C;Ctr): 35 (0;-3)[3]	Windows with min. construction: IGU system of 6 mm float / 12 mm air gap / 10 mm float

Note 1: These are preliminary selections; they will be confirmed in the detailed design stage once the layouts and façade orientations are approved.

Note 2: Recommended treatments apply to all levels.

Note 3: Note: if executive offices / acoustically sensitive spaces are located against the external façade, a higher rated glazing system would be recommended.

Please note for windows, this performance is not only subject to the glazing selection but also to the construction of the window frame and the frame seal selection. Therefore, it is recommended that the window manufacturer should confirm that the required sound insulation can be achieved. It is anticipated that the window system should comprise Q-Lon (or equivalent) or fin seals with deep C channels as part of the window track (i.e., Performance levels outlined above need to be achieved with glazed panels + frame + seals).

4.2.2 External Wall Construction

It is expected that the external wall constructions are constructed either from concrete or a masonry construction, no further acoustic upgrading is required. If penetrations through any external skin are required, all gaps remaining in the penetration are to be filled with an acoustic grade sealant which provides an equal or better performance to the system being penetrated.

Any light-weight external plasterboard walls should be constructed from a construction with a minimum acoustic performance of Rw 55.

4.2.3 External Roof Construction

It is proposed that the new roof will be a green roof incorporating roof garden and PV panels, on top of concrete slab structure. As the roof is anticipated to be concrete external roof construction, no additional acoustic treatment will be required.

If penetrations through any external skin are required, all gaps remaining in the penetration are to be filled with an acoustic grade sealant which provides an equal or better performance to the system being penetrated.

4.3 External Noise Emissions from Engineering Services

At this stage of the project, the proposed location of the key plant items has been determined, however, equipment has not been selected.

All future plant and equipment are to be acoustically treated to ensure the noise levels at all surrounding receivers comply with noise emission criteria detailed within this report. Experience with similar projects indicates that it is both possible and practical to treat all mechanical equipment such that the relevant noise levels are achieved. Examples of the possible acoustic treatments to mechanical equipment includes the following:

- Supply and Exhaust Fans – location of fans within the building and treated using internally lined ductwork or acoustic silencers.

- General supply and exhaust fans – general exhaust and supply fans such as toilet, kitchen, lobby and other small mechanical fans can be acoustically treated using acoustic flex ducting or internally lined ducting.

- External Chillers/Cooling Equipment – The project will include external chillers for the operation of the cooling of the building. The proposed location of the cooling tower equipment, including the roof top plant area on the new level 11 of the building.

Details of all mechanical services equipment and associated acoustic treatments to ensure the relevant noise level criteria is achieved will be provided as part of the Construction Certificate submission of the project.

Experience with similar projects indicates that the acoustic treatment of whatever mechanical equipment is to be installed on the project is both possible and practical.

4.4 Noise from additional vehicles on surrounding road network

As previously stated, the function room and new terrace will not increase the number of office spaces as it is specifically designed for inhouse functions, events and entertaining. As such, it is anticipated that the proposed minor addition will not result in increase in vehicle movements to the site.

4.5 Operation noise – Rooftop terrace noise assessment

The assessment of entertainment noise emissions from the proposed rooftop private recreation area have been assessed against the adopted entertainment noise criteria identified previously in Section 3.3 above.

4.5.1 Calculation assumptions

For the purpose of this assessment, the following assumptions have been applied in the calculations of the entertainment and patron noise emission to the nearest noise sensitive receivers.

- Entertainment noise sources from the roof top private recreation area has been assessed by considering the barrier effects of a 2.3 m high glass balustrade that is proposed to be installed along the perimeter of the roof top area.

- For a total patron number of 320, it is assumed that 1 in 2 patrons will be speaking at any one time. A relatively conservative calculation.

- It is assumed that a single person speaking with a raised voice has a Sound Power Level (Lw) of 76 dB(A). This has been formulated in accordance with the published noise levels from Klark Teknik (The Audio System Designer Technical Reference, Chapman Partnership).

- With regards to amplified music within the entertainment facility, the adopted typical music spectrum is shown below.

Table 11 Single Octave (1/1) Spectrum of Reverberant SPL of Amplified Music

Location	Parameter 1	Octave Band Centre Frequency, Hz									Overall dBA
		31.5	63	125	250	500	1k	2k	4k	8k	
SPL within proposed terrace areas	Typical amplified music for a multipurpose venue.										
	Adopted LAeq	75	75	79	81	81	81	76	76	75	85

4.5.2 Predicted Entertainment Noise Levels

Noise emission calculations for the combination of patron noise and amplified music are provided below.

Predicted noise levels to the surrounding receivers are based on a full capacity (defined as 320 patrons) within the Level 11 roof terrace, and during the proposed operation hours (daytime period only 7:00 am – midnight). A conservative approach of 1 in 2 patrons speaking at any given time has been applied.

Outlined in the tables below are the predicted operational noise levels to the nearest two noise sensitive receivers to site as identified above. Predicted noise levels include distance attenuation and any barrier effects.

Provided below are the worst-case predictions for the identified nearest receivers surrounding the project site.

Table 12 Predicted Operational Noise Levels – Receiver 1 - Daytime period (7:00am – midnight)

Parameter	Octave Band Centre Frequency, Hz									Overall dBA
	31.5	63	125	250	500	1k	2k	4k	8k	
Predicted LAeq Noise Levels	38	24	36	39	39	32	27	22	18	**38**
Daytime entertainment noise criterion (Logger A)	70	67	65	63	64	62	57	49	36	**66**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**

Table 13 Predicted Operational Noise Levels – Receiver 2 - Daytime period (7:00am – midnight)

Parameter	Octave Band Centre Frequency, Hz									Overall dBA
	31.5	63	125	250	500	1k	2k	4k	8k	
Predicted LAeq Noise Levels	37	22	32	35	35	31	27	21	17	**36**
Daytime entertainment noise criterion (Logger B)	74	75	72	69	66	63	57	49	37	**68**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**

Table 14 Predicted Operational Noise Levels – Receiver 4 – Daytime period (7:00am – midnight)

Parameter	Octave Band Centre Frequency, Hz									Overall dBA
	31.5	63	125	250	500	1k	2k	4k	8k	
Predicted LAeq Noise Levels	37	21	32	34	35	31	27	21	17	**36**
Daytime entertainment noise criterion (Logger B)	74	75	72	69	66	63	57	49	37	**68**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**

Table 15 Predicted Operational Noise Levels – Receiver 6 - Daytime period (7:00am – midnight)

Parameter	Octave Band Centre Frequency, Hz									Overall dBA
	31.5	63	125	250	500	1k	2k	4k	8k	
Predicted LAeq Noise Levels	37	22	32	34	35	31	27	21	17	**36**
Daytime entertainment noise criterion (Logger B)	60*	60	57	54	51	48	42	34	22	**59**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**

Table 16 Predicted Operational Noise Levels – Receiver 7 - Daytime period (7:00am – midnight)

Parameter	Octave Band Centre Frequency, Hz									Overall dBA
	31.5	63	125	250	500	1k	2k	4k	8k	
Predicted LAeq Noise Levels	36	22	32	35	35	29	25	20	16	**35**
Daytime entertainment noise criterion (Logger A)	70	67	65	63	64	62	57	49	36	**66**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**

4.5.3 Assessment Results and Recommendations

Entertainment noise levels including patron noise and amplified music noise from the operation of the proposed level 11 roof terrace have been assessed with the above assumptions. The predicted results indicate that the entertainment noise emission from the proposed use of the rooftop area during the day period (7:00am – midnight) will comply with the City of Sydney entertainment noise criteria adopted for this assessment. To ensure compliance is achieved, the following recommendations must be implemented:

- Operation hours are: 7:00 am – midnight – 7 days per week.
- Amplified music/sound is permitted on the roof terrace, however, must be limited to 85 dB(A) LAeq when measured as a sound pressure level within the space.
- A 2.3 m high glass balustrade must be installed along the perimeter of the rooftop area (excluding the eastern façade).

On the assumption the recommendations outlined are incorporated compliance with the acoustic project criteria outlined in Section 3 above will be achieved.

4.6 Operational Noise – Level 10 Function Space

Entertainment noise from the use of the proposed level 10 Function Space is anticipated to be similar in nature and noise characteristics to the adopted assumptions to the Level 11 roof terrace. As the level 10 function space is proposed to be enclosed, the recommended façade glazing in Table 10 will be sufficient to contain entertainment noise breakout from generating adverse noise impacts at nearby sensitive receivers.

To ensure compliance is achieved, the following recommendations must be implemented:

- Operation hours are: 7:00 am – midnight – 7 days per week.

- Amplified music/sound is permitted within the level 10 function space provided that the reverberant sound pressure level from the sound system is limited to 85 dB(A) LAeq when measured as a sound pressure level within the space.

5 CONCLUSIONS

This Noise Impact Assessment has been prepared by Pulse White Noise Acoustics (PWNA) on behalf Canva (the applicant) in support of a Planning Proposal (PP) submitted to the City of Sydney Council (CoSC). This PP relates to the proposed minor rooftop additions at 8-24 Kippax Street, Surry Hills (the site).

This PP is for the minor rooftop additions which include increased building height and FSR, and comprise of:

- Enclosing and converting the current level 10 roof terrace into an internal function room
- Constructing a new level 11 on top of the level 10 function room.
- Relocate current level 10 external terrace to the new level 11.
- Ancillary works, including site services.

The function room and new terrace will not increase the number of office spaces as it is specifically designed for inhouse functions, events and entertaining.

As part of this assessment, we have undertaken a review of the building envelope and noise emissions from the minor additions. From this assessment we note the following:

- Minimum acoustic performances and associated indicative constructions for the building envelope of the Level 10 Function Space have been provided in section 4.2 of this report. The recommended treatments have been provided to ensure compliance with the objectives presented in 3.1.
- To control noise impacts at external receivers, recommended indicative treatments for major engineering services have been provided in Section 4.3. From our review we have formulated the following opinion:
    - At this stage of the project the exact selections/locations of plant items are not completed. A preliminary assessment, however, has been carried out using our experience with similar types of developments and the typical plant items installed. Experience with similar projects indicates that the acoustic treatment of the likely mechanical equipment to be installed on the project is both possible and practical.
- Entertainment noise emissions from the use of the Level 11 roof terrace and the Level 10 function space have been assessed. Compliance with the City of Sydney Council typical entertainment noise criteria can be achieved with the implementation of the recommended noise controls.

Based on this assessment, the Planning Proposal for the minor additions at 8 – 24 Kippax Street Surry Hill is acoustically acceptable and can be designed to meet typical acoustic criteria listed above providing the recommendations detailed in this report are included in the design and construction of the project.

Regards,

Leo Tsui

Principal Acoustic Engineer

PULSE WHITE NOISE ACOUSTICS PTY LTD

APPENDIX A: ACOUSTIC TERMINOLOGY

The following is a brief description of the acoustic terminology used in this report.

Sound power level	The total sound emitted by a source
Sound pressure level	The amount of sound at a specified point
Decibel [dB]	The measurement unit of sound
A Weighted decibels [dB(A])	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).
Decibel scale	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:

0 dB(A)	Threshold of human hearing
30 dB(A)	A quiet country park
40 dB(A)	Whisper in a library
50 dB(A)	Open office space
70 dB(A)	Inside a car on a freeway
80 dB(A)	Outboard motor
90 dB(A)	Heavy truck pass-by
100 dB(A)	Jackhammer/Subway train
110 dB(A)	Rock Concert
115 dB(A)	Limit of sound permitted in industry
120 dB(A)	747 take off at 250 metres

Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.
Ambient sound	The all-encompassing sound at a point composed of sound from all sources near and far.
Equivalent continuous sound level [L_{eq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.
Reverberation	The persistence of sound in a space after the source of that sound has been stopped (the reverberation time is the time taken for a reverberant sound field to decrease by 60 dB)
Air-borne sound	The sound emitted directly from a source into the surrounding air, such as speech, television or music
Impact sound	The sound emitted from force of one object hitting another such as footfalls and slamming cupboards.
Air-borne sound isolation	The reduction of airborne sound between two rooms.
Sound Reduction Index [R] (Sound Transmission Loss)	The ratio the sound incident on a partition to the sound transmitted by the partition.
Weighted sound reduction index [R_w]	A single figure representation of the air-borne sound insulation of a partition based upon the R values for each frequency measured in a laboratory environment.
Level difference [D]	The difference in sound pressure level between two rooms.

Normalised level difference [D_n]	The difference in sound pressure level between two rooms normalised for the absorption area of the receiving room.
Standardised level difference [D_{nT}]	The difference in sound pressure level between two rooms normalised for the reverberation time of the receiving room.
Weighted standardised level difference [$D_{nT,w}$]	A single figure representation of the air-borne sound insulation of a partition based upon the level difference. Generally used to present the performance of a partition when measured in situ on site.
C_{tr}	A value added to an R_w or $D_{nT,w}$ value to account for variations in the spectrum.
Impact sound isolation	The resistance of a floor or wall to transmit impact sound.
Impact sound pressure level [L_i]	The sound pressure level in the receiving room produced by impacts subjected to the adjacent floor or wall by a tapping machine.
Normalised impact sound pressure level [L_n]	The impact sound pressure level normalised for the absorption area of the receiving room.
Weighted normalised impact sound pressure level [$L_{n,w}$]	A single figure representation of the impact sound insulation of a floor or wall based upon the impact sound pressure level measured in a laboratory.
Weighted standardised impact sound pressure level [$L'_{nT,w}$]	A single figure representation of the impact sound insulation of a floor or wall based upon the impact sound pressure level measured in situ on site.
C_I	A value added to an L_{nW} or $L'_{nT,w}$ value to account for variations in the spectrum.
Energy Equivalent Sound Pressure Level [$L_{A,eq,T}$]	'A' weighted, energy averaged sound pressure level over the measurement period T.
Percentile Sound Pressure Level [$L_{Ax,T}$]	'A' weighted, sound pressure that is exceeded for percentile x of the measurement period T.

*Definitions of a number of terms have been adapted from Australian Standard AS1633:1985 *"Acoustics – Glossary of terms and related symbols"*