



# 13-15, 17 Oxford Street, 2 Verona Street, Paddington

Noise and Vibration Impact Assessment

Project No.	P02598
Revision	005
Issued	22 May 2026
Client	17 Oxford St Pty Ltd

**E-LAB Consulting**

Where science and engineering inspire design.

## Document QA and Revisions

ISSUE	DATE	COMMENTS	ENGINEER	REVIEWER
1	05/11/2025	For SSDA	Oscar Koch	Kanin Mungkarndee
2	18/11/2025	For SSDA	Oscar Koch	Kanin Mungkarndee
3	21/11/2025	For SSDA	Oscar Koch	Kanin Mungkarndee
4	14/04/2026	For SSDA	Oscar Koch	Artie Rattananikom
5	22/05/2026	Updated for RTS Comments	Oscar Koch	Artie Rattananikom

### Confidentiality:

*This document contains commercial information which has been prepared exclusively for the use by The Principal. The document in its entirety is confidential. No information contained in this document may be released in part or whole to any third party without the approval of the Author or The Principal.*

### Authorised by:

Engineering Lab NSW Pty Ltd



Brandon Notaras | Director

Acoustics & Vibration



# Table of Content

<b>1</b>	<b>EXECUTIVE SUMMARY</b>	<b>4</b>
<b>2</b>	<b>INTRODUCTION</b>	<b>5</b>
2.1	DOCUMENT PURPOSE	5
2.2	SEAR'S RESPONSE	5
2.3	RELEVANT DOCUMENTS	5
<b>3</b>	<b>PROJECT SITE</b>	<b>6</b>
3.1	DEVELOPMENT PROPOSAL	6
<b>4</b>	<b>METHODOLOGY</b>	<b>8</b>
<b>5</b>	<b>NOISE MONITORING</b>	<b>9</b>
5.1	INSTRUMENTATION	9
5.2	LONG-TERM NOISE MONITORING	9
5.3	SHORT-TERM (ATTENDED) NOISE MONITORING	10
<b>6</b>	<b>PROJECT NOISE AND VIBRATION CRITERIA</b>	<b>11</b>
6.1	PLANNING SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEAR'S)	11
6.2	INTERNAL NOISE LEVELS	11
6.3	EXTERNAL NOISE EMISSIONS	14
6.4	PATRON AND MUSIC NOISE EMISSIONS	18
6.5	TRAFFIC NOISE GENERATION	19
6.6	CONSTRUCTION NOISE CRITERIA	20
6.7	CONSTRUCTION VIBRATION CRITERIA	21
<b>7</b>	<b>OPERATIONAL NOISE AND VIBRATION ASSESSMENT</b>	<b>24</b>
7.1	MECHANICAL SERVICES	24
7.2	CARPARK USAGE	24
7.3	LOADING DOCK	24
7.4	GROUND FLOOR RETAIL	25
7.5	CREATIVE CULTURAL USE – LIQUOR ACT ASSESSMENT	25
7.6	TRAFFIC AIRBORNE NOISE INTRUSION	27
7.7	EXTERNAL ENTERTAINMENT NOISE IMPACTS	28
7.8	OUTDOOR COMMUNAL SPACES	30
7.9	TRAFFIC NOISE GENERATION	30



<b>8</b>	<b><u>CONSTRUCTION NOISE AND VIBRATION ASSESSMENT</u></b>	<b>31</b>
8.1	PROPOSED CONSTRUCTION ACTIVITIES	31
8.2	EXPECTED CONSTRUCTION EQUIPMENT	31
8.3	NOISE MODELLING AND ASSUMPTIONS	33
8.4	PREDICTED NOISE LEVELS	33
8.5	CONSTRUCTION VIBRATION ASSESSMENT	35
<b>9</b>	<b><u>MITIGATION MEASURES</u></b>	<b>36</b>
9.1	MECHANICAL PLANT AND EQUIPMENT NOISE MITIGATION	36
9.2	OUTDOOR COMMUNAL SPACES	36
9.3	TRAFFIC AIRBORNE NOISE INTRUSION	36
9.4	LOADING DOCK	37
9.5	CREATIVE CULTURAL SPACES	37
9.6	EXTERNAL ENTERTAINMENT ACTIVITY NOISE	37
9.7	CONSTRUCTION NOISE AND VIBRATION	38
<b>10</b>	<b><u>CONCLUSION</u></b>	<b>41</b>
<b>APPENDIX A</b>	<b><u>FAÇADE NOISE MAP</u></b>	<b>42</b>
<b>APPENDIX B</b>	<b><u>ALTERNATIVE VENTILATION MARKUP</u></b>	<b>43</b>
<b>APPENDIX C</b>	<b><u>FAÇADE GLAZING MARKUP</u></b>	<b>44</b>
<b>APPENDIX D</b>	<b><u>CONSTRUCTION NOISE CONTOUR MAPS</u></b>	<b>45</b>
<b>APPENDIX E</b>	<b><u>NOISE MONITORING DATA</u></b>	<b>46</b>



# 1 EXECUTIVE SUMMARY

This noise and vibration report has been prepared by E-LAB Consulting to accompany a State Significant Development Application (SSD-87245208) for the proposed mixed-use development at 13-15, 17 Oxford Street, and 2 Verona Street, Paddington.

The proposal broadly seeks SSD approval for the construction and operation of a 7-storey mixed use development including residential housing, ground floor retail spaces as well as a creative cultural space that operates on the ground floor and basement level 3 & 4.

The development is located at 13-15, 17 Oxford Street, and 2 Verona Street, Paddington within the City of Sydney Council local government area (LGA). The SSDA seeks consent for the following:

- The demolition of existing structures on site, with retention of the two-storey masonry façade at 17 Oxford Street.
- Construction of a seven-storey, mixed use infill affordable housing development comprising:
  - Apartments located along the Oxford and Verona Street frontages including:
    - 46 market dwellings; and
    - 14 affordable housing dwellings, to be managed by a registered Community Housing Provider for a minimum of 15 years.
  - Four Terraces on the existing 2 Verona Street lot.
  - Cultural and creative uses (including cinema/bar) at basement and ground levels.
  - Ground level retail.
  - Two levels of basement car parking.
  - Associated landscaping including a central landscaped courtyard and rooftop communal open space.

This report concludes that the proposed development is acceptable and warrants approval subject to the implementation of the mitigation measures outlined in Section 9.

Following implementation of the mitigation measures, the remaining noise and vibration impacts are appropriate.

Further to the above, Revision 5 of this report prepared 22<sup>nd</sup> May 2026 has been updated to address the RFI's relating to Revision 4 received from the City of Sydney Council and NSW 24-Hour Economy Commissioner. As per the Response to Acoustic RFI's letter date 22<sup>nd</sup> May 2026, Section 7.7 of this report includes an assessment of existing and future external entertainment activity noise. Mitigation measures are outlined in Section 9.6 to ensure compliance with the internal noise targets established in Section 6.2.3.



## 2 INTRODUCTION

### 2.1 DOCUMENT PURPOSE

This Noise and Vibration Impact Assessment has been prepared by E-LAB Consulting on behalf of 17 Oxford Pty Ltd (the Applicant) to accompany a State Significant Development Application (SSDA) for a mixed-use development with infill affordable housing. The site is located at 13–15, 17 Oxford Street, and 2 Verona Street, Paddington, within the City of Sydney local government area (LGA).

In summary, the purpose of this report is to:

- Identify surrounding noise-sensitive receivers;
- Identify relevant standards and guidelines and to establish noise and vibration project requirements for the construction and operation of the site;
- Provide a noise and vibration assessment for the construction of the site, which discusses the expected construction stages, expected machinery / activities involved;
- Provide a noise and vibration assessment for the operation of the site, which discusses both noise emissions from the proposed development (including traffic generation), and noise intruding into the development from road and rail; and
- Outline mitigation measures and recommendations to ensure project noise and vibration requirements are satisfied.

### 2.2 SEAR'S RESPONSE

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEAR's) dated 15 July 2025 issued for the SSDA (SSD-87245208). Specifically, this report has been prepared to respond to the SEAR's requirement issued below.

ITEM	DESCRIPTION OF REQUIREMENT
10. Noise and Vibration	Provide a noise and vibration impact 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.

### 2.3 RELEVANT DOCUMENTS

The following standards, guidelines and drawings have been used to establish the project specific acoustic design requirements for the development.

- Architectural drawings prepared by TZG Architects dated 7 April 2025;
- State Environmental Planning Policy (SEPP) (Transport and Infrastructure) 2021;
- Development Near Rail Corridors and Busy Roads – Interim Guideline;
- NSW Noise Policy for Industry (NPI) 2017;
- NSW Road Noise Policy (RNP), 2011;
- Interim Construction Noise Guideline (ICNG) 2009;
- Assessing vibration: A Technical Guideline 2006;
- British Standard BS5228 – Part 1:1997 “Noise and Vibration Control on Construction and Open Sites.”;
- British Standard BS7385:1993 “Evaluation and Measurement for Vibration in Buildings”; and
- German Standard DIN4150 – Part 3: “Structural vibration in buildings – Effects on structures”.



### 3 PROJECT SITE

The site occupies a corner position at the intersection of Oxford Street and Verona Street and has a total area of 2,533sqm. The site comprises three allotments legally described as Lot 1 in DP 75105 (2 Verona Street), Lot 1 in DP 137013 (17 Oxford Street), and Strata Plan 22113 (13–15 Oxford Street).

The location of the proposal, noise monitoring and measurement positions, and the surrounding noise-sensitive receivers are shown in Figure 1. The noise-sensitive receivers have been delineated into receiver catchments (RCs) as noted in Figure 1. Receiver catchments have been identified with a detailed description in Table 1 below.

Table 1: Description of nearby noise sensitive receiver catchments

RECEIVER CATCHMENT	DESCRIPTION
RC1 – Residential	Existing shop-top residential housing situated on the north side of Oxford Street.
RC2 – Residential	Existing terraced housing situated south across Verona Street.
RC3 – Residential	Existing multi-storey residential developments and terraced housing adjacent to the western and southern boundaries of the site.
RC4 – Commercial	Existing Bookshop / Café East of the site across Verona Street.
RC5 – Hotel	Existing Hotels (Oxford House, Victoria Barracks) East of the site across Verona Street.
RC6 – Hotel	25Hours Hotel The Olympia situated adjacent to the Northwest site boundary on 1-11 Oxford Street.

#### 3.1 DEVELOPMENT PROPOSAL

The SSDA seeks consent for:

- The demolition of existing structures on site, with retention of the two-storey masonry façade at 17 Oxford Street.
- Construction of a seven-storey, mixed use infill affordable housing development comprising:
  - Apartments located along the Oxford and Verona Street frontages including:
    - 46 market dwellings; and
    - 14 affordable housing dwellings, to be managed by a registered Community Housing Provider for a minimum of 15 years.
  - Four Terraces on the existing 2 Verona Street lot.
  - Cultural and creative uses (including cinema/bar) at basement and ground levels.
  - Ground level retail.
  - Two levels of basement car parking.
  - Associated landscaping including a central landscaped courtyard and rooftop communal open space.



Figure 1: Acoustic site plan identifying the surrounding noise-sensitive receivers and noise monitoring locations



## 4 METHODOLOGY

To assess the noise and vibration impacts of the proposed development, the following process was carried out:

- Identify and classify the surrounding noise and vibration sensitive receivers surrounding the proposed development;
- Identify and classify the noise and vibration sources generated by the proposed development, together with external noise and vibration sources impacting on the proposed development;
- Carry out site noise investigations to quantify the background noise levels local to the proposed development;
- Determine the project noise and vibration criteria applicable to the proposed development in accordance with relevant standards and guidelines;
- Assess the operational and construction noise and vibration impacts of the noise and vibration sources generated by the proposed development to the surrounding noise-sensitive receivers, together with any impacts on the occupants of the proposed development; and
- Provide details of mitigation measures required to alleviate noise and vibration impacts to achieve the project noise and vibration criteria.

The following operational noise and vibration assessments were conducted as part of this report:

- Road noise intrusion into the development from traffic movement on surrounding local roads;
- Noise and vibration impact of mechanical plant and equipment serving the proposed development on surrounding noise and vibration sensitive receivers; and
- Noise impacts of additional traffic on surrounding local roads generated by the proposed development.

The following construction noise and vibration assessments were conducted as part of this report:

- Noise generated during the construction of the proposed development and associated impacts on the surrounding noise sensitive receivers; and
- Vibration generated during the construction of the proposed development and associated impacts on the surrounding vibration sensitive receivers.



## 5 NOISE MONITORING

### 5.1 INSTRUMENTATION

The equipment used for the noise survey was the following:

- NTI XL2 Integrating Sound Level Meter (S/N: AZA-23754-E1)
- Bruel and Kjaer Sound calibrator Type 4231 (S/N: 3029638)
- 3 x NSRT mk3 Sentry Noise Loggers

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.

### 5.2 LONG-TERM NOISE MONITORING

Long term noise monitoring has been undertaken for the project site at locations shown in Figure 1 to measure the background and ambient noise that is representative of the surrounding noise and vibration sensitive receivers. Monitoring was conducted from Tuesday 26<sup>th</sup> August 2025 to Tuesday 2<sup>nd</sup> September 2025. Noise monitoring has been undertaken in line with the NPI to establish background noise levels surrounding the project site, including the following:

- Noise monitoring data is used when average wind speed is under 5m/s at the microphone height
- Noise monitoring data is used when there is no rainfall
- Extraneous noise levels have been filtered from the data set to provide representative background noise conditions
- Noise monitors were calibrated prior and post monitoring to ensure no drift in calibration
- Sentry Positions LT1 and LT3 have minimum one (1) weeks' worth of noise monitoring data
- Sentry Position LT2 has produced slightly under one (1) week of noise monitoring data, however this has still resulted in an accurate RBL in accordance with the NPI's procedures due to the low levels of rain and wind affected data, and the seventh day of data captured all periods of time (i.e. day, evening and night). Note that additional short term noise monitoring was carried out at LT2 to validate the long term noise monitoring results.

Detailed graphical noise monitoring data is presented in Appendix E.

#### 5.2.1 Background Noise

Background noise levels and subsequent Rating Background Noise Level (RBL) have been established in accordance with the Noise Policy for Industry 2017 using the results of the noise monitoring at locations LT1-LT3 as indicated in Figure 1. The local ambient noise environment is typical of an Urban residential environment (as described by the NPI).

Table 2: Unattended noise monitoring results

LOCATION	MEASURED EQUIVALENT CONTINUOUS NOISE LEVEL – $L_{EQ}$ dB(A)			MEASURED RATING BACKGROUND NOISE LEVELS – $L_{90}$ dB(A)		
	DAY	EVENING	NIGHT	DAY	EVENING	NIGHT
LT1	73	70	68	60	53	46
LT2	63	62	60	52	46	43
LT3	56	53	51	48	45	43



**General Note:** Noise Policy for Industry (NPI) assessment periods – Daytime: 7:00 am to 6:00 pm Monday to Saturday, 8:00 am to 6:00 pm Sundays and Public Holidays; Evening: 6:00 pm to 10:00 pm; Night: 10:00 pm to 8:00 am Monday to Saturday, 10:00 pm to 8:00 am Sundays and Public Holidays.

## 5.2.2 Traffic Noise

In addition to background noise, long-term noise monitoring was also conducted at the project site to establish traffic and rail noise levels respectively for the site and have been summarised in Table 3.

*Table 3: Long-term traffic noise monitoring results*

LOCATION	MEASURED NOISE LEVELS, $L_{Aeq,period}$ dB(A)	
	DAY (7AM – 10PM)	NIGHT (10PM – 7AM)
LT1	71	68
LT2	63	60
LT3	56	51

## 5.3 SHORT-TERM (ATTENDED) NOISE MONITORING

Short-term noise measurements were conducted at the subject site to determine the environmental noise characteristics. The results of the measurements are presented in Table 4.

*Table 4: Short-term noise measurement summary*

MEASUREMENT LOCATION	MEASUREMENT TIME	$L_{Aeq}$ dB(A)	$L_{A90}$ dB(A)	$L_{A10}$ dB(A)	COMMENTS
ST1 – Oxford Street	Friday 5 <sup>th</sup> September 2025 1:00pm-1:15pm	70	57	73	Dominant noise source in the area was continuous traffic along Oxford Street
ST2 – Verona Street	Friday 5 <sup>th</sup> September 2025 12:41pm-12:56pm	65	53	65	Dominant noise source in the area was continuous traffic along Oxford Street.
ST3 – Corner of Oxford Street and Verona Street	Friday 8 <sup>th</sup> May 2026 8:45pm -9:00pm	70	57	73	Dominant noise source in the area was intermittent traffic along Oxford Street.
ST4 – Oxford Street	Friday 8 <sup>th</sup> May 2026 9:05pm -9:20pm F	71	62	75	Dominant noise source in the area was intermittent traffic along Oxford Street.

## 6 PROJECT NOISE AND VIBRATION CRITERIA

The project noise and vibration criteria has been established considering the following documents:

- State Environmental Planning Policy (SEPP) (Transport and Infrastructure) 2021;
- Development Near Rail Corridors and Busy Roads – Interim Guideline;
- NSW 24-Hour Economy Commissioner Acoustic Toolkit
- City of Sydney Special Entertainment Precincts Management Plan (Draft 2026)
- NSW Road Noise Policy (RNP), 2011;
- NSW Noise Policy for Industry (NPI) 2017;
- Interim Construction Noise Guideline (ICNG) 2009;
- Assessing vibration: A Technical Guideline 2006;
- British Standard BS5228 – Part 1:1997 “Noise and Vibration Control on Construction and Open Sites.”;
- British Standard BS7385:1993 “Evaluation and Measurement for Vibration in Buildings”; and
- German Standard DIN4150 – Part 3: “Structural vibration in buildings – Effects on structures”.

### 6.1 PLANNING SECRETARY’S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEAR’S)

The SEAR’s acoustic requirements for the development are as follows:

#### **10. Noise & 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.*

### 6.2 INTERNAL NOISE LEVELS

#### 6.2.1 SEPP (Transport and Infrastructure) 2021

Clause 2.120 of SEPP 2021 states the following requirements for the impact of road noise or vibration on non-road development:

##### **2.120 Impact of road noise or vibration on non-road development**

- (1) *This section applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration—*
  - (a) *residential accommodation,*
  - (b) *a place of public worship,*
  - (c) *a hospital,*
  - (d) *an educational establishment or centre-based childcare facility.*
- (2) *Before determining a development application for development to which this section applies, the consent authority must take into consideration any guidelines that are issued by the Planning Secretary for the purposes of this section and published in the Gazette.*



- (3) *If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—*
- (a) *in any bedroom in the residential accommodation—35 dB(A) at any time between 10 pm and 7 am,*
- (b) *anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.*
- (3A) *Subsection (3) does not apply to a building to which State Environmental Planning Policy (Housing) 2021, Chapter 3, Part 7 applies.*
- (4) *In this section, freeway, tollway and transitway have the same meanings as they have in the Roads Act 1993.*

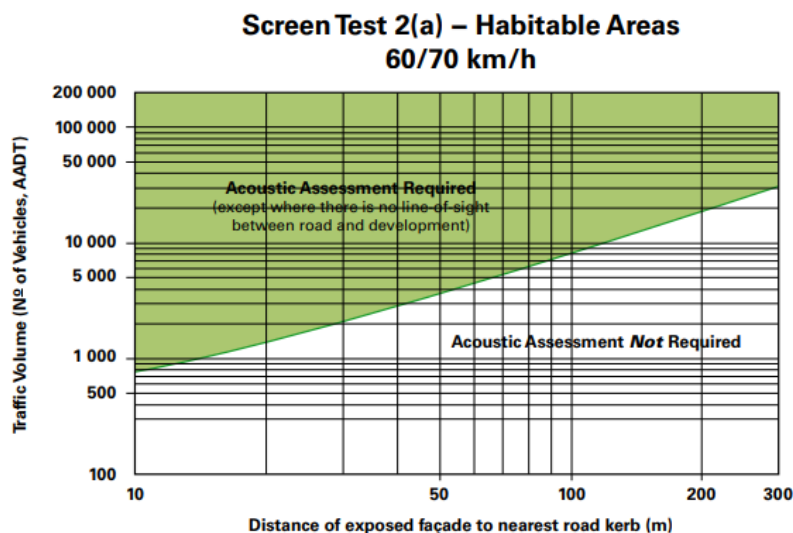
## 6.2.2 Development Near Rail Corridors and Busy Roads – Interim Guideline

### Road Noise Assessment

Figure 2 has been extracted from the Interim Guideline and provides a screening test for noise sensitive developments that takes into account the volume of traffic and the distance between the proposed development and the busy road. Clause 2.120 of the State Environmental Planning Policy (Transport and Infrastructure) 2021, through which the Interim Guideline road noise criteria applies through, only applies for roads with an annual average daily traffic volume (AADT) of more than 20,000 vehicles, or if the road is a freeway, tollway or transitway. The screen test has been conducted to establish whether or not an acoustic assessment is required.

In this case, based on Map 12D of the Transport for NSW traffic volume maps, Oxford Street and South Dowling Street are identified as a road carrying more than 20,000 vehicles and is mandatory for under Clause 2.120 of SEPP (Transport and Infrastructure) 2021.

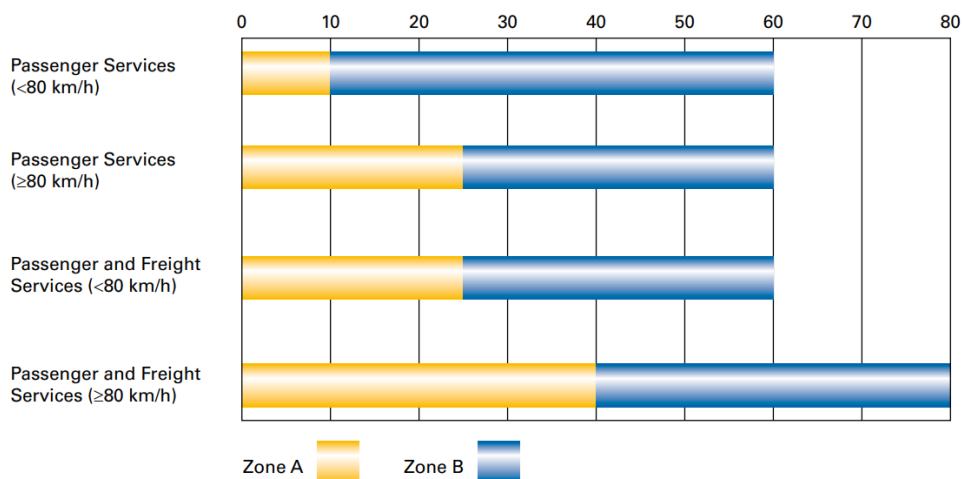
Figure 2: Screen tests for habitable areas of multiple dwellings (noting that any exposed facade is direct line-of-sight)



### Rail Noise Assessment

Figure 3 which has been extracted from the Interim Guideline provides guidance as to the level of assessment required when noise sensitive developments are located in the vicinity of existing rail lines. Zones A and B are indicative acoustic assessment zones where sensitive land-uses are likely to be adversely affected.

Figure 3: Acoustic assessment zones based on distance (m) of noise-sensitive development from operation track (not corridor)



Given the proposed development boundary is located at least 800m from the nearest rail corridor, an assessment of rail noise to the facades of the proposed development is not required.

**Criteria – Road Noise**

The Interim Guideline details the application of the SEPP 2007, which we note has been superseded by SEPP 2021. In addition, the Interim Guideline also recommends the following in relation to the assessment of ventilation by means of opened windows or doors:

*If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.*

Table 5 provides a summary of the criteria established in accordance with the Interim Guideline and SEPP 2021.

Table 5: Summary of internal noise criteria from the Interim Guideline and SEPP 2021

TYPE OF HABITABLE SPACE	APPLICABLE TIME PERIOD	INTERNAL NOISE LEVEL CRITERIA – WINDOWS/DOORS CLOSED	INTERNAL NOISE LEVEL CRITERIA – WINDOWS/DOORS OPEN
Sleeping areas (bedrooms)	10:00pm – 7:00am	35 dB(A) LAeq(9hour)	45 dB(A) LAeq(9hour)
Living rooms	At any time	40 dB(A) LAeq(15hour)	50 dB(A) LAeq(15hour)

### 6.2.3 External Entertainment Activity Noise Impacts

Noise impacts from entertainment venues in the vicinity of the project site have been assessed using the framework provided in the following guidelines:

- NSW 24-Hour Economy Commissioner Acoustic Toolkit
- City of Sydney Special Entertainment Precincts Management Plan (Draft 2026)

The City of Sydney Draft Special Entertainment Precincts (SEP) Management Plan identifies the project site as Sound Category Area SCA2. The corresponding internal noise targets applied to habitable rooms of receivers are summarised in Table 6.

Table 6: Project internal noise targets (existing entertainment noise)

SOUND CATEGORY AREA (SCA)	DAY OF THE WEEK	TIME OF DAY	OCTAVE BAND NOISE LEVELS, dB				
			31.5 Hz	63 Hz	125 Hz	250 Hz	A-WT
SCA2	Any Day	Day/Evening (7am-10pm)	56	52	49	47	<b>48</b>
		Early Night (10pm-12am)	51	46	43	42	<b>40</b>
		Late Night (12am-7am)	51	37	32	30	<b>30</b>

The NSW 24HEC Acoustic Toolkit states that as a minimum, consideration should be given to an “agent of change” framework. We note, the Draft SEP management plan does not provide guidance regarding the control of noise from future venues within the SEP, however references Section 3.18 of the City of Sydney Development Control Plan which states:

*“Development specified for this section must comply with the internal criteria for sound from any pre-existing, planned or approved entertainment sound generating activities shown in Table 1”.*

## 6.3 EXTERNAL NOISE EMISSIONS

### 6.3.1 NSW EPA Noise Policy for Industry (NPI) 2017 – Industrial Noise (Plant and Equipment)

The NSW EPA’s Noise Policy for Industry (NPI) 2017 has been implemented to assess the noise impacts of mechanical plant and equipment, as well as other industrial noise sources on the surrounding receiver catchments.

The NPI sets out a framework for the derivation of project noise trigger levels that are used to assess the potential impacts of noise from industry (and industrial noise sources) and indicate the noise level at which feasible and reasonable noise management measures should be considered.

This policy applies to noise sources from activities listed in Schedule 1 of the POEO Act and those regulated by the EPA. This includes noise sources from mechanical plant and equipment within the proposed redevelopment, for which this policy will be applied.

The project noise trigger level provides a benchmark for assessing a proposal, where if exceeded, indicates a potential noise impact on the community and so triggers a management response such as additional mitigation measures. The project noise trigger level is the lower (the more stringent) value of the project intrusiveness noise level and project amenity noise level determined in Sections 2.3 and 2.4 of the NPI, respectively.



Project Intrusiveness Noise Level

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (in terms of  $L_{Aeq}$ ) measured over a 15-minute period does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. The project intrusiveness noise level is only applicable to surrounding residential receivers.

To account for the temporal variation of background noise levels, the method outlined in Fact Sheet A of the NPI establishes a method in determining the Rating Background Noise Level (RBL) to be used in the assessment.

The intrusiveness noise level is determined as follows:

$$L_{Aeq,15min} \text{ (Intrusiveness Criteria)} = \text{Rating Background Noise Level (RBL)} + 5 \text{ dB(A)}$$

Table 7 provides the project intrusiveness noise levels applicable to each of the surrounding residential noise-sensitive receivers. Receiver catchments are provided in Table 1.

*Table 7: Project intrusiveness noise level criteria for each residential receiver catchment*

RECEIVER CATCHMENT	TIME OF DAY	MEASURED RBL - dB(A)	PROJECT INTRUSIVENESS NOISE LEVELS - $L_{Aeq,15min}$ dB(A)
RC1 <sup>1</sup>	Day	60	65
	Evening	53	58
	Night	46	51
RC2 <sup>2</sup>	Day	52	57
	Evening	46	51
	Night	43	48
RC3 <sup>3</sup>	Day	48	53
	Evening	45	50
	Night	43	48

**Note 1** – Based on the results of long-term unattended noise monitoring at monitoring position LT1.

**Note 2** – Based on the results of long-term unattended noise monitoring at monitoring position LT2.

**Note 3** – Based on the results of long-term unattended noise monitoring at monitoring position LT3.

Project Amenity Noise Level

The recommended amenity noise levels represent the objective for total industrial noise at a receiver location, whereas the project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

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:

$$\text{Project Amenity Noise Level} = \text{Recommended Amenity Noise Level (see Table 8)} - 5 \text{ dB(A)}$$

The recommended amenity noise level, project amenity noise level, and converted project amenity noise level for comparison with the intrusiveness criteria (from time-of-day period to 15-minute) is provided for each surrounding receiver catchment in Table 8.



Table 8: Project amenity noise level criteria for each receiver catchment

RECEIVER CATCHMENT	RECEIVER TYPE	TIME OF DAY	RECOMMENDED AMENITY NOISE LEVEL - $L_{Aeq,period}$ dB(A)	PROJECT AMENITY NOISE LEVEL - $L_{Aeq,period}$ dB(A)	PROJECT AMENITY NOISE LEVEL - $L_{Aeq,15min}$ dB(A)
RC1	Residential – Urban <sup>1</sup>	Day	60	58	61 <sup>2</sup>
		Evening	50	55	58 <sup>2</sup>
		Night	45	53	56 <sup>2</sup>
RC2	Residential – Urban <sup>1</sup>	Day	60	55	58
		Evening	50	47	50 <sup>2</sup>
		Night	45	45	48 <sup>2</sup>
RC3	Residential – Urban <sup>1</sup>	Day	60	55	58
		Evening	50	45	48
		Night	45	40	43
RC4	Commercial	When in use	65	60	63
RC5	Hotel	Day	65	60	63
		Evening	55	50	53
		Night	50	45	48
RC6	Hotel	Day	65	60	63
		Evening	55	50	53
		Night	50	45	48

**Note 1:** Urban residential as classified in Table 2.3 of the Noise Policy for Industry (NPI) 2017.

**Note 2:** Based on the long-term noise monitoring, the high traffic project amenity noise levels are applicable to these assessment periods and have been established per the requirements of Section 2.4.1 from the Noise Policy for Industry (NPI) 2017.

#### Sleep Disturbance and Maximum Noise Level Assessment

Where the proposed redevelopment night-time noise levels generated at a residential location exceed either:

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

a detailed maximum noise level event assessment should be undertaken.

#### Corrections for Annoying Noise Characteristics – Noise Policy for Industry Fact Sheet C

Fact Sheet C contained within the Noise Policy for Industry outlines the correction factors to be applied to the source noise level at the receiver before comparison with the project noise trigger levels established within this report, to account for the additional annoyance caused by these modifying factors.

The modifying factor corrections should be applied having regard to:

- The contribution noise level from the premises when assessed/measured at a receiver location, and
- The nature of the noise source and its characteristics (as set out in Fact Sheet C)



Table C1 within Fact Sheet C sets out the corrections to be applied for any assessment in-line with the NPI. The corrections specified for tonal, intermittent and low-frequency noise are to be added to be added to the measured or predicted levels at the receiver before comparison with the project noise trigger levels. The adjustments for duration are to be applied to the criterion.

Project Noise Trigger Levels

Table 9 presents the project intrusiveness and project amenity noise levels for each period, and each receiver catchment, as well as the resultant project noise trigger levels (PNTLs) that shall be applied for any assessment of impacts of mechanical plant and equipment noise on the surrounding receiver catchments.

*Table 9: Project noise trigger levels (PNTL) to be applied to each surrounding receiver catchment*

RECEIVER CATCHMENT	RECEIVER TYPE	TIME OF DAY	PROJECT INTRUSIVENESS NOISE LEVEL - dB(A) $L_{Aeq,15min}$	PROJECT AMENITY NOISE LEVEL - dB(A) $L_{Aeq,15min}$	SLEEP DISTURBANCE NOISE LEVEL - dB(A)	PROJECT NOISE TRIGGER LEVEL - dB(A) $L_{Aeq,15min}$
RC1	Residential – Urban	Day	65	61	N/A	61
		Evening	58	58	N/A	58
		Night	51	56	51dB(A) $L_{eq}$ and 61dB(A) $L_{max}$	51dB(A) $L_{eq}$ and 61dB(A) $L_{max}$
RC2	Residential – Urban	Day	57	58	N/A	57
		Evening	51	50	N/A	50
		Night	48	48	48dB(A) $L_{eq}$ and 58dB(A) $L_{max}$	48dB(A) $L_{eq}$ and 58dB(A) $L_{max}$
RC3	Residential – Urban	Day	53	58	N/A	53
		Evening	50	48	N/A	48
		Night	48	43	48dB(A) $L_{eq}$ and 58dB(A) $L_{max}$	43dB(A) $L_{eq}$ and 58dB(A) $L_{max}$
RC4	Commercial	When in use	-	63	N/A	63
RC5	Hotel	Day	-	63	N/A	63
		Evening	-	53	N/A	53
		Night	-	48	N/A	48
RC6	Hotel	Day	-	63	N/A	63
		Evening	-	53	N/A	53
		Night	-	48	N/A	48



## 6.4 PATRON AND MUSIC NOISE EMISSIONS

### 6.4.1 Liquor Act 2007 – Noise from music and patrons (Licensed Premises)

The noise emissions criteria from the NSW Liquor Act 2007 shall be applied to noise from any music/entertainment and patrons from the licensed premises and assessed to the surrounding residential receivers.

A summary of the noise emissions requirements for licensed premises within the NSW Liquor Act 2007 is provided in Table 10 for all surrounding residential receivers.

Table 10: Summary of NSW Liquor Act 2007 noise emission criteria

PERIOD	OCTAVE BAND CENTRE FREQUENCIES	NOISE CRITERIA - dB(A)
7am – 12am	From 31.5 Hz to 8000 Hz	$L_{A10, \text{oct}} \leq L_{A90, \text{oct}} + 5$ at property boundary
12am-7am	From 31.5 Hz to 8000 Hz	$L_{A10, \text{oct}} \leq L_{A90, \text{oct}}$ at property boundary
		Inaudible in habitable rooms

### 6.4.2 Summarised Music & Patron Noise Emission Criteria

Specific octave band noise emission requirements based on short-term measurements and long-term unattended noise monitoring is summarised in Table 11.

Table 11: Single Octave Band Noise Emission Requirements for Licensed Premises (External Noise Levels)

TIME OF DAY	SINGLE OCTAVE BAND NOISE LEVELS – dB, L <sub>10</sub>									
	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
<b>Residential Receiver RC1 (External)</b>										
Day (7am – 6pm)	74	72	66	65	61	61	57	50	40	<b>65</b>
Evening (6pm – 10pm)	67	65	59	58	54	54	50	43	33	<b>58</b>
Night (10pm – 12am)	60	58	52	51	47	47	43	36	26	<b>51</b>
Night (12am – 7am)	45	43	37	36	32	32	28	21	11	<b>36</b>
<b>Residential Receiver RC2 (External)</b>										
Day (7am – 6pm)	68	64	58	57	53	53	49	41	31	<b>57</b>
Evening (6pm – 10pm)	62	58	52	51	47	47	43	35	25	<b>51</b>
Night (10pm – 12am)	59	55	49	48	44	44	40	32	22	<b>48</b>
Night (12am – 7am)	44	40	34	33	29	29	25	17	7	<b>33</b>
<b>Residential Receiver RC3 (External)</b>										
Day (7am – 6pm)	64	60	54	53	49	49	45	37	27	<b>53</b>
Evening (6pm – 10pm)	61	57	51	50	46	46	42	34	24	<b>50</b>
Night (10pm – 12am)	59	55	49	48	44	44	40	32	22	<b>48</b>
Night (12am – 7am)	44	40	34	33	29	29	25	17	7	<b>33</b>



## 6.5 TRAFFIC NOISE GENERATION

The  $L_{Aeq}$  noise level or the “equivalent continuous noise level” correlates best with the human perception of annoyance associated with traffic noise.

Road traffic noise impact is assessed in accordance with the NSW Road Noise Policy (RNP). The criterion (Table 3 – Road Traffic Noise Assessment Criteria for Residential Land Uses) divides land use developments into different categories and lists the respective criteria for each case. The category that is relevant to the proposed use of the site is shown below in Table 12.

Table 12: NSW RNP – Traffic Noise Assessment Criteria

ROAD CATEGORY	TYPE OF PROJECT/LAND USE	ASSESSMENT CRITERIA – dB(A)	
		DAY (7AM – 10PM)	NIGHT (10PM – 7AM)
Freeway/ arterial/ sub-arterial roads	1. Existing residences affected by noise from new freeway/arterial/sub-arterial road corridors	$L_{Aeq}$ , (15 hour) 55	$L_{Aeq}$ , (15 hour) 50
	2. Existing residences affected by noise from redevelopment of existing freeway/arterial/sub-arterial roads	$L_{Aeq}$ , (15 hour) 60	$L_{Aeq}$ , (15 hour) 55
	3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments		
Local Roads	4. Existing residences affected by noise from new local road corridors	$L_{Aeq}$ , (1 hour) 55	$L_{Aeq}$ , (1 hour) 50
	5. Existing residences affected by noise from redevelopment of existing local roads		
	6. Existing residences affected by additional traffic on existing local roads generated by land use developments		

In the event that the traffic noise at the site is already in excess of the criteria noted above, the NSW RNP states that the primary objective is to reduce the existing level through feasible and reasonable measures to meet the criteria above.

If this is not achievable, Section 3.4.1 of the RNP states that for existing residences affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise should be limited to 2 dB above that of the corresponding ‘no build option’.

Also, the inherent quality of noise from vehicles on public roads arriving to and departing from the site would be indistinguishable from other traffic noise on public roads.

## 6.6 CONSTRUCTION NOISE CRITERIA

### 6.6.1 Interim Construction Noise Guideline (ICNG)

The noise criteria outlined within the ICNG has been adopted for the assessment of noise emissions from the construction of the proposed redevelopment.

#### Airborne Noise – Residential Receiver Catchments

The airborne noise criteria for surrounding residential receiver catchments (RC1, RC2 and RC3) have been extracted from Table 2 in the ICNG and is presented in Table 13 below.

*Table 13: NSW ICNG construction noise criteria for surrounding residential receiver catchments (RC1, RC2 and RC3)*

TIME OF DAY	MANAGEMENT LEVEL $L_{Aeq,15min}^1$	HOW TO APPLY
Recommended Standard Hours:  Monday – Friday 7am – 6pm	Noise Affected RBL + 10dB	<p>The noise-affected level represents the point above which there may be some community reaction to noise.</p> <ul style="list-style-type: none"> <li>▪ Where the predicted or measured <math>L_{Aeq,15min}</math> is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>▪ The proponent should also inform all potentially impacted residences of the nature of works to be carried out, the expected noise levels and duration as well as contact details.</li> </ul>
Saturday 8am – 1pm  No work on Sundays or public holidays	Highly Noise Affected 75 dB(A)	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <ul style="list-style-type: none"> <li>▪ Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur in, taking into account: <ul style="list-style-type: none"> <li>– Times identified by the community when they are less sensitive to noise (such as before and after school, for works near schools, or mid-morning or mid-afternoon for works near residences)</li> <li>– If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</li> </ul> </li> </ul>
Outside Recommended Standard Hours	Noise Affected RBL + 5dB	<ul style="list-style-type: none"> <li>▪ The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>▪ Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.</li> <li>▪ For guidance on negotiating agreements see section 7.2.2.</li> </ul>

**Note 1:** Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30m of the residence. Noise levels may be higher at upper floors of the noise affected residence.



## Airborne Noise – Other Sensitive Land Uses

The airborne noise criteria for surrounding land uses have been extracted from Table 3 in the ICNG and is presented in Table 14 below.

Table 14: NSW ICNG construction noise criteria for other sensitive land uses

LAND USE	MANAGEMENT LEVEL (APPLIES WHEN BEING USED)  $L_{Aeq,15min}$
Classrooms at schools and other educational institutions / Hospital wards and operating theatres / Places of worship	45 dB(A) - Internal
Active Recreation Areas	65 dB(A) - External
Passive Recreation Areas	60 dB(A) - External
Commercial Premises (offices, retail outlets)	70 dB(A) - External

## Ground-borne Noise – Residential Receiver Catchments

Ground-borne noise is noise generated by vibration transmitted through the ground into a structure, such as an excavator with a hydraulic hammer attachment, or impact/bore piling. The following ground-borne noise levels for residences have been extracted from Section 4.2 of the ICNG and indicate when management actions should be implemented.

- Evening (6pm to 10pm) – Internal Noise Level:  $L_{Aeq,15min}$  40 dB(A); and
- Night-time (10pm to 7am) – Internal Noise Level:  $L_{Aeq,15min}$  35 dB(A).

An assessment of ground-borne noise to these levels is only required when the ground-borne noise levels are higher than airborne noise levels, and for surrounding residential receiver catchments. The ground-borne noise levels are for evening and night-time periods only. The levels shall be assessed at the centre of the most affected habitable room.

## 6.7 CONSTRUCTION VIBRATION CRITERIA

It is important for vibration emissions from vibration-intensive equipment utilised during the construction works be managed to maintain appropriate levels of human comfort, and to avoid both cosmetic and structural damage. The vibration limits proposed in the ensuing sub-sections aid in achieving this outcome.

### 6.7.1 Human Comfort

The office of Environment and Heritage (OEH) developed a document, “Assessing Vibration: A Technical Guideline” in February 2006 to assist in preventing people from exposure to excessive vibration levels from construction and operation of a development within buildings. The guideline does not however address vibration induced damage to structures or structure-borne noise effects. Vibration and its associated effects are usually classified as continuous, impulsive or intermittent.

#### Continuous and Impulsive Vibration

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.

Maximum allowable magnitudes of building vibration with respect to human response are shown in Table 15. It should be noted that the human comfort for vibration is more stringent than the building damage criteria.

Table 15: Preferred and maximum weighted RMS values for continuous and impulsive vibration acceleration ( $m/s^2$ ) 1-80 Hz



LOCATION	ASSESSMENT PERIOD <sup>1</sup>	PREFERRED VALUES		MAXIMUM VALUES	
		z-axis	x- and y-axes	z-axis	x- and y-axes
Continuous vibration					
Critical areas <sup>2</sup>	Day- or night time	0.0050	0.0036	0.010	0.0072
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day- or night time	0.020	0.014	0.040	0.028
Impulsive vibration					
Residences	Daytime	0.30	0.21	0.60	0.42
	Night time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day- or night time	0.64	0.46	1.28	0.92

**Note 1:** Daytime is 7:00am to 10:00pm and night time is 10:00pm to 7:00am

**Note 2:** Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specified above. Stipulation of such criteria is outside the scope of this policy, and other guidance documents (e.g. relevant standards) should be referred to. Source: BS 6472–1992

### Intermittent Vibration Criteria

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. Various studies support the fact that VDV assessment methods are far more accurate in assessing the level of disturbance than methods which is only based on the vibration magnitude.

*Table 16: Acceptable vibration dose values for intermittent vibration (m/s<sup>1.75</sup>)*

LOCATION	DAYTIME <sup>1</sup>		NIGHT-TIME <sup>1</sup>	
	PREFERRED VALUE	MAXIMUM VALUE	PREFERRED VALUE	MAXIMUM VALUE
Critical areas <sup>2</sup>	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

**Note 1:** Daytime is 7:00am to 10:00pm and night time is 10:00pm to 7:00am

**Note 2:** Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specified above. Stipulation of such criteria is outside the scope of this policy, and other guidance documents (e.g. relevant standards) should be referred to. Source: BS 6472–1992



### 6.7.2 Cosmetic Damage

Structural vibration thresholds are set to minimize the risk of cosmetic surface cracks and lie below the levels that have the potential to cause damage to the main structure. Table 17 presents guide values for building vibration, based on the vibration thresholds above which cosmetic damage has been demonstrated outlined within BS7385-Part 2:1993. 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.

Table 17: Transient vibration guide values for cosmetic damage – BS 7385-2:1993

TYPE OF BUILDING	PEAK PARTICLE VELOCITY IN FREQUENCY RANGE OF PREDOMINANT PULSE (PPV)	
	4 HZ TO 15 HZ	15 HZ AND ABOVE
Reinforced or framed structures Industrial or light commercial type buildings	50mm/s	N/A
Unreinforced or light framed structures, Residential or light commercial type buildings	15mm/s	20mm/s (50mm/s at 40Hz and above)

### 6.7.3 Structural Damage

Ground vibration criteria is defined in terms of the levels of vibration emission from the construction activities which will avoid the risk of damaging 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.

Most specified structural vibration levels are defined to minimize the risk of cosmetic surface cracks and are set below the levels that have the potential to cause damage to the main structure. Structural damage criteria are presented in German Standard DIN4150-Part 3 “Structural vibration in buildings – Effects on structures” and British Standard BS7385-Part 2: 1993 “Evaluation and Measurement for Vibration in Buildings”. Table 18 indicates the vibration limits presented in DIN4150-Part 3 to ensure structural damage doesn’t occur.

Table 18: Guideline value of vibration velocity,  $v_i$ , for evaluating the effects of short-term vibration – DIN4150-3

LINE	TYPE OF STRUCTURE	VIBRATION VELOCITY, $v_i$ , IN mm/s			
		FOUNDATION			PLANE OF FLOOR OF UPPERMOST FULL STOREY
		AT A FREQUENCY OF			
		LESS THAN 10HZ	10 TO 50HZ	50 TO 100HZ*	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 100Hz, at least the values specified in this column shall be applied



## 7 OPERATIONAL NOISE AND VIBRATION ASSESSMENT

### 7.1 MECHANICAL SERVICES

At this stage of the proposed development, the design has not progressed enough for mechanical plant and equipment selections are yet to be made. During the design development stage of the project, the mitigation measures outlined below should be considered when preparing the mechanical services, to ensure compliance with the external noise emissions criteria established in Section 0.

### 7.2 CARPARK USAGE

It is proposed that all carparking be situated in an enclosed car parking area on Basement Levels B1 and B2 accessed from Verona St. As such, it can be reasonably expected that the use of the carparking will not have noise impact on the nearest noise sensitive receivers and noise level criteria in Section 6.2 will be met.

### 7.3 LOADING DOCK

An indicative assessment of the noise generated by general loading dock activities for the project site has been conducted to determine the impacts on the surrounding noise receivers. At the time of writing, E-LAB Consulting has not been advised of the operational constraints of the loading dock. In this instance, we have used the following assumptions in our assessment:

- Sound power levels are as per Table 19
- Loading dock usage is limited between the hours of 7am – 10pm
- 1 service vehicle (e.g. HRV) enters or exits the development in a 15-minute period at all times
- Service vehicle engines are switched off when parked
- Service vehicle airbrakes are only released inside the loading dock

Table 19 presents the typical sound power level (SWL) associated with general loading dock activities.

Table 19: Typical sound power levels

ACTIVITIES	SOUND POWER LEVEL – dB(A)
HRV Idling – $L_{Aeq,period}$	95
HRV Engine Start – $L_{Aeq,period}$	102
HRV Airbrakes – $L_{Aeq,period}$	113
Loading and Unloading Activities – $L_{Aeq,period}$	93
HRV Manoeuvring @ 10km/hr – $L_{Aeq,period}$	91

### 7.3.1 Predicted Noise Levels

The noise generated by the activities during a 15-minute period have been predicted to the facades of the surrounding receiver catchments and are summarised below in Table 20. Attenuation factors from distance, barriers, etc. have been applied where applicable. Noise impact at residential receivers have been assessed to the evening time criteria (being the most stringent within the operating hours).

Table 20: Loading Dock Predicted Noise Levels at Most Affected Receiver Catchment

RECEIVER CATCHMENT	PREDICTED NOISE LEVEL dB(A) $L_{Aeq,15min}$	PROJECT NOISE TRIGGER LEVEL dB(A) $L_{Aeq,15min}$	COMPLIES (YES/NO)
RC1	< 40	58	Yes
RC2	49	50	Yes
RC3	48	48	Yes
RC4	58	63	Yes
RC5	48	53	Yes
RC6	< 40	53	Yes

Based on our assumptions and assessment, the predicted noise levels at the surrounding receiver catchments from the use of the loading dock are expected to comply with the project noise trigger levels established in Section 6.3.1 without additional mitigation measures.

## 7.4 GROUND FLOOR RETAIL

At the time of writing, the tenants for the retail spaces have not been determined and therefore the operational details and internal layouts for these spaces are unknown.

Future usage of the retail spaces will likely be subject to a separate development application and detailed assessment of their expected operation and activities may be required by City of Sydney Council. The selected tenants will likely be required by Council to submit a separate Development Application based on use.

## 7.5 CREATIVE CULTURAL USE – LIQUOR ACT ASSESSMENT

An assessment of noise from music and patrons within licensed areas of the premises to surrounding residences has been conducted to determine noise transmission impacts, and suitable noise mitigation measures where required. Noise from the following areas have been assessed, based on the assumptions listed:

- The creative cultural space that is located within the basement 3 & 4 level is fully enclosed and therefore is not expected to contribute to the noise emission impact at surrounding external receivers. Subsequently, the noise emissions from the use of the cultural creative space will primarily be from the ground floor area, which we understand will act as a bar / lobby / transient space prior to occupants entering the basement area.
- To be conservative, it is assumed that the average sound pressure level inside the creative cultural space on the ground floor is 85dB(A)  $L_{Aeq,15min}$ , representative of a densely packed acoustic environment (i.e. at capacity) with loud music for functions/events.
- It is assumed that the average sound pressure level inside the bar / breakout areas in Basement 3 & 4 is 90dB(A)  $L_{Aeq,15min}$ . While the cinema / theatre rooms assumed average sound pressure level is 95dB(A)  $L_{Aeq,15min}$  conservatively representative of an extremely loud periods of film viewing.



- The internal stairway providing access from the ground floor to the basement level 3 & 4 are continually open during operation of the space.
- The spectral characteristic of the creative cultural event spaces is provided in Table 21.
- Mitigation measures nominated in 9.5 are adopted.
- Acoustic design of cinema rooms will be addressed as part of detailed design

Table 21: Typical patron and music noise frequency spectrum

NOISE SOURCE	SINGLE OCTAVE BAND NOISE LEVELS – dB, L <sub>10</sub>									
	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Patron and music noise inside event space with bar	65	65	76	80	82	74	72	69	65	<b>82</b>

Noise levels from patrons and music bar have been predicted based on the mitigation measures (operational and building construction) detailed in Section 9.5. Predicted noise levels at surrounding residential receivers are summarised in Table 22.

Table 22: Predicted noise levels to noise sensitive residences

TIME OF DAY		SINGLE OCTAVE BAND NOISE LEVELS – dB									
		31.5HZ	63 HZ	125 HZ	250 HZ	500 HZ	1 KHZ	2 KHZ	4 KHZ	8 KHZ	DB(A)
<b>RC1 – EXTERNALLY (RESIDENTIAL)</b>											
Predicted Noise Level dB, L <sub>A10</sub>		<b>25</b>	<b>25</b>	<b>34</b>	<b>34</b>	<b>32</b>	<b>19</b>	<b>16</b>	<b>7</b>	<b>7</b>	<b>31</b>
Day (7am-6pm)	Noise Criteria dB, L <sub>A10</sub>	74	72	66	65	61	61	57	50	40	<b>65</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
Evening (6pm-10pm)	Noise Criteria dB, L <sub>A10</sub>	67	65	59	58	54	54	50	43	33	<b>58</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
Night (10pm-12am)	Noise Criteria dB, L <sub>A10</sub>	60	58	52	51	47	47	43	36	26	<b>51</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
Late Night (12am-7am)	Noise Criteria dB, L <sub>A10</sub>	45	43	37	36	32	32	28	21	11	<b>36</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
<b>RC2 – EXTERNALLY (RESIDENTIAL)</b>											
Predicted Noise Level dB, L <sub>A10</sub>		<b>17</b>	<b>17</b>	<b>25</b>	<b>25</b>	<b>23</b>	<b>15</b>	<b>8</b>	<b>&lt;5</b>	<b>&lt; 5</b>	<b>22</b>
Day (7am-6pm)	Noise Criteria dB, L <sub>A10</sub>	68	64	58	57	53	53	49	41	31	<b>57</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
Evening (6pm-10pm)	Noise Criteria dB, L <sub>A10</sub>	62	58	52	51	47	47	43	35	25	<b>51</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
Night (10pm-12am)	Noise Criteria dB, L <sub>A10</sub>	59	55	49	48	44	44	40	32	22	<b>48</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
Late Night (12am-1am)	Noise Criteria dB, L <sub>A10</sub>	44	40	34	33	29	29	25	17	7	<b>33</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
<b>RC3 – EXTERNALLY (RESIDENTIAL)</b>											



TIME OF DAY		SINGLE OCTAVE BAND NOISE LEVELS – dB									
		31.5HZ	63 HZ	125 HZ	250 HZ	500 HZ	1 KHZ	2 KHZ	4 KHZ	8 KHZ	DB(A)
Predicted Noise Level dB, L <sub>A10</sub>		<b>25</b>	<b>25</b>	<b>33</b>	<b>33</b>	<b>29</b>	<b>23</b>	<b>16</b>	<b>&lt; 5</b>	<b>&lt; 5</b>	<b>30</b>
Day (7am-6pm)	Noise Criteria dB, L <sub>A10</sub>	64	60	54	53	49	49	45	37	27	<b>53</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
Evening (6pm-10pm)	Noise Criteria dB, L <sub>A10</sub>	61	57	51	50	46	46	42	34	24	<b>50</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
Night (10pm-12am)	Noise Criteria dB, L <sub>A10</sub>	59	55	49	48	44	44	40	32	22	<b>48</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>
Late Night (12am-1am)	Noise Criteria dB, L <sub>A10</sub>	44	40	34	33	29	29	25	17	7	<b>33</b>
	Complies (Y/N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	<b>YES</b>

**Note 1:** Assessment location for residential receivers detailed in Table 1.

Based on our assumptions and assessment, the predicted noise levels at the surrounding receiver catchments from the use of the creative cultural spaces are expected to comply with the Liquor Act 2007 criteria for music and patrons as established in Section 6.4.

## 7.6 TRAFFIC AIRBORNE NOISE INTRUSION

### 7.6.1 Noise Modelling and Assumptions

In order to provide acoustic amenity to occupants of the proposed development and achieve the recommended internal noise limits, the noise impact of surrounding noise sources was assessed at the façade of the proposed development within the proposed development.

3D acoustic modelling for noise emissions from the surrounding roads and rail lines was conducted using the software SoundPLAN (Version 9.0). Noise emissions from major roads bounding the site were modelled in accordance with the CoRTN prediction techniques and calibrated to the measurements conducted for this assessment.

Attenuation due to distances, building shielding and environmental absorption, together with additional noise incident on the façade due to façade reflections are taken into account within the 3D model.

### 7.6.2 “Windows Closed” Assessment

The results of the 3D modelling are provided in Appendix A (in the form of façade noise contours), showing the incident noise levels on the façade (daytime and night-time) as a result of external road noise sources. The incident noise levels are presented as L<sub>Aeq,15hour</sub> and L<sub>Aeq,9hour</sub> statistical metrics for the purpose of demonstrating compliance with SEPP 2021 and the Interim Guideline, and mitigation measures are presented in Section 9.2.

### 7.6.3 “Windows Open” Assessment

A preliminary “windows open” assessment has been conducted to assess whether the habitable spaces can meet the project internal noise limits established in Section 6.2 with windows open for natural ventilation (open in accordance with the natural ventilation requirements of the NCC).

If the project internal noise limits for windows/doors open is exceeded, the habitable area is considered noise-affected and an alternative means of ventilation is required in accordance with the requirements of the NCC (i.e. an alternative ventilation system complying with AS 1668.2 and AS/NZS 3666.1).



The assessment has been conducted under the assumption the occupant has opened their windows to achieve natural ventilation (and as recommended in the Interim Guideline), that is, when the windows are open to 5% of the floor area of the room being ventilated, with a reduction of incident noise level to internal noise level of 10dB(A). Room loss has also been considered as part of this assessment.

In order to achieve the project internal noise limits established in Section 6.2 whilst simultaneously achieving the ventilation requirements, mitigation measures have been proposed in Section 9.2 for the proposed development.

## 7.7 EXTERNAL ENTERTAINMENT NOISE IMPACTS

Existing entertainment noise in the vicinity the project site has been quantified through attended noise measurements, as detailed in Table 4. Based on measurement results and on-site investigations, the following conclusions have been drawn:

- Entertainment noise from restaurants or cafes surrounding the project site which operate during the Day is insignificant relative to existing traffic noise impacts from Oxford Street. Façade glazing requirements have been nominated to mitigate traffic noise in line with NSW Planning guidelines as detailed in Section 7.6 above. The glazing treatments specified to address traffic noise will also provide sufficient attenuation of existing entertainment activity noise during the Day period.
- Three existing venues were identified in proximity to the project site with the potential to generate audible entertainment noise during the early and late-night periods. The acoustic impacts associated with these venues are discussed below:

Table 23: Review of Existing External Entertainment Noise

EXISTING VENUE	COMMENT
Dr Goodes Bar	<ul style="list-style-type: none"> <li>▪ Attended measurements were undertaken during a typical Friday night on the corner of Oxford and Verona Street (refer to measurement position ST3 in Figure 1).</li> <li>▪ Music and patron noise were inaudible at an ambient noise level of 57dB(A).</li> <li>▪ Glazing treatment for the purpose of traffic noise mitigation will be sufficient in attenuating existing entertainment noise from this venue.</li> </ul>
Beecham Hotel	<ul style="list-style-type: none"> <li>▪ Attended measurements were undertaken during a typical Friday night on the corner of Oxford and Verona Street (refer to measurement position ST3 in Figure 1).</li> <li>▪ Music and patron noise were inaudible at an ambient noise level of 62dB(A).</li> <li>▪ Glazing treatment for the purpose of traffic noise mitigation will be sufficient in attenuating existing entertainment noise from this venue.</li> </ul>
Monica Rooftop Bar	<ul style="list-style-type: none"> <li>▪ Attended measurements of the rooftop bar were not possible at the future façade of the development.</li> <li>▪ Conservatively, operational noise emission limits from the DA approved “Environmental Impact Assessment” prepared by Acoustic Logic dated 10<sup>th</sup> March 2024 have been considered in our assessment and applied at the façade of the most affected residences within the project site. These limits are summarised Table 24.</li> <li>▪ Façade glazing mitigation measures have been nominated in Appendix C which take into account entertainment noise from this venue, to ensure internal noise limits from existing entertainment noise in Section 6.2.3 are achieved.</li> </ul>

Table 24: DA Approved noise emission limits for Monica Rooftop Bar Venue

FREQUENCY	SINGLE OCTAVE BAND NOISE LEVELS – dB, L <sub>10</sub>									
	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Day (7am-6pm)	74	74	69	66	64	64	60	53	45	<b>68</b>
Evening (6pm-10pm)	72	72	66	64	61	62	57	50	42	<b>65</b>
Early Night (10pm-12am)	62	62	57	54	52	52	48	41	33	<b>56</b>
Late Night (12am – 2am)	57	57	52	49	47	47	43	36	28	<b>51</b>

- Further to the above, there are no future venues known to be planned or approved in close proximity to the project site (relative to those identified in Table 23).
- On this basis, considerations have been made for both existing and future entertainment activity surrounding the project site in accordance with the framework provided by the NSW 24HEC Acoustic Toolkit, and City of Sydney Draft SEP Management Plan.

Figure 4: Existing Entertainment Venues Surrounding Project Site



## 7.8 OUTDOOR COMMUNAL SPACES

It is proposed that the development will consist of residential communal on ground floor and on rooftop level. The intended design and usage of these areas are for passive recreational use by residents and are not intended for noise intensive events (e.g. commercial events/parties with amplified music). The anticipated noise emissions from typical residential use, primarily casual conversation, is consistent with normal residential environments and additional acoustic treatment is not warranted.

Nonetheless, general recommendations have been provided in Section 9.2 to minimise noise impacts on surrounding receivers.

## 7.9 TRAFFIC NOISE GENERATION

Based on the information provided by JMT Consulting, it is expected that the largest net increase on Verona St to be 18 vehicles trips during the peak hour period. In addition to the monitored existing traffic noise levels along Verona Street (where carparking access is located), it is predicted that the increase in the total traffic noise along Verona Street will not be greater than 2dB and the requirements of the Road Noise Policy (outlined in Section 6.5) will be capable of compliance without further acoustic mitigation measures.

## 8 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

It is noted that a detailed construction plan/methodology is not available at this stage and a contractor has not been appointed. As such, the below assessment is indicative and should be further developed as part of a Construction Noise and Vibration Management Sub-Plan.

### 8.1 PROPOSED CONSTRUCTION ACTIVITIES

In this assessment, the noise impact from the construction works are considered, which are expected to comprise of the following indicative major stages of works:

- Early Works – Demolition
- Civil works – Excavation and foundation
- Structural works – Construction

The construction works are expected to occur during the following hours (in line with the NSW ICNG):

- Monday to Friday: 7:00am to 6:00pm;
- Saturday: 8:00am to 1:00pm; and
- Sunday and public holidays: no work.

### 8.2 EXPECTED CONSTRUCTION EQUIPMENT

The noise sources likely to be associated with the works listed in the previous section of this report are presented in Table 25. The equipment noise levels have been extracted from AS2436:2010 “Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites”.



Table 25: Cumulative impact – construction equipment noise levels

STAGES	EQUIPMENT	SOUND POWER LEVEL – dB(A)	USAGE IN 15-MINUTE PERIOD (MINUTES)	TIME CORRECTED SOUND POWER LEVEL– dB(A) $L_{Aeq,15min}$
Early Works - Demolition	Jackhammer	113	3	106
	Powered hand tool	102	7.5	99
	Excavator 30 tonne	110	6	106
	Excavator breaker	115	6	111
	Bobcat	107	10.5	105
	Cherry picker	102	7.5	99
	General Truck	108	6	104
Civil works – Excavation and foundation	Excavator breaker	115	6	111
	Excavator 30 tonne	110	6	106
	Concrete pump	109	7.5	106
	Concrete Truck	108	7.5	105
	Generator	104	3	97
	Mobile crane	110	2.4	102
	General Truck	108	6	104
Structural works - Construction	Powered hand tool	102	7.5	99
	Mobile crane	110	2.4	102
	Generator	104	3	97
	General Truck	108	6	104



### 8.3 NOISE MODELLING AND ASSUMPTIONS

In order to assess the noise impact from the site during the various construction stages, a noise model was prepared using commercial software SoundPLAN v9.0, which is a comprehensive software package for conducting three-dimensional complex noise propagation modelling. Using the software, a 3D model of the site and its surroundings was constructed including the nearby buildings, and the construction plant and equipment were positioned as noise sources. Within the model, the effects of the environment (built and natural) on propagation of sound were considered to reliably estimate the resulting noise effects on the surrounding noise sensitive receivers.

The noise model represents the ‘reasonable’ worst case periods of construction activities, meaning that all the equipment of each stage is operating simultaneously during a 15-minute observation period.

The assumptions that were made within the assessment include the following:

- The predicted noise levels represent the worst-case scenario for each receiver;
- Neutral weather conditions.
- Provision of a 2.1m Class-A hoarding around the perimeter of the site.

### 8.4 PREDICTED NOISE LEVELS

The predicted noise levels have been presented in Table 26 to Table 28 have been assessed to the construction noise management levels established in Section 6.6. The noise contour maps produced by the three-dimensional noise propagation modelling are provided in Appendix D.

*Table 26: Predicted noise levels – Early Works - Demolition*

RECEIVER	PREDICTED NOISE LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	EXCEEDS HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1	72	70	2	No
RC2	74	62	12	No
RC3	83	58	25	Yes
RC4	76	70	6	N/A
RC5	70	62	8	No
RC6	83	58	25	Yes



**Table 27: Predicted noise levels – Civil works – Excavation and foundation**

RECEIVER	PREDICTED NOISE LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	EXCEEDS HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1	72	70	2	No
RC2	74	62	12	No
RC3	85	58	27	Yes
RC4	76	70	6	N/A
RC5	69	62	7	No
RC6	76	58	18	Yes

**Table 28: Predicted noise levels – Structural works - Construction**

RECEIVER	PREDICTED NOISE LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	EXCEEDS HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1	66	70	-	No
RC2	65	62	3	No
RC3	71	58	13	No
RC4	71	70	1	N/A
RC5	59	62	-	No
RC6	71	58	13	No

## 8.5 CONSTRUCTION VIBRATION ASSESSMENT

It is expected that majority of vibration intensive activities will occur during the demolition and excavation works where excavator mounted hammering may be utilised.

Safe working distances for vibration intensive plant and are quoted for both “cosmetic” damage (in accordance with BS 7385) and human comfort (in accordance with Assessing Vibration – a technical guideline), have been provided, based on the Transport for NSW’s “Construction Noise Strategy (2013)”. The recommended safe working distances for each of the plant listed above are provided in Table 29.

Table 29: Recommended safe working distances for vibration intensive plant

ACTIVITY	SAFE WORKING DISTANCE (METRES)	
	COSMETIC DAMAGE (BS 7385)	HUMAN RESPONSE (OH&E VIBRATION GUIDELINE)
Piling	2m (nominal)	N/A
Jackhammering	1m (nominal)	Avoid contact with structure
Rock Breaking	22m	73m
Rock Sawing	22m	73m

Attended vibration monitoring should be considered at the commencement of vibration inducing activities (rock breaking and hammering) in order to verify the safe working distances. If the levels are compliant with the vibration limits as listed in Section 6.7, then work may proceed based on the implementation of the measures detailed in this report. If there are exceedances, reasonable and feasible mitigation measures should be considered to lessen the impact, such as an alternative method of activity or using machinery with less capacity, and additional vibration monitoring should be conducted.

Monitoring strategies have been discussed in Section 9.7.2, which shall be reviewed as part of a future construction noise and vibration management plan once construction methodologies are known.

## 9 MITIGATION MEASURES

It is noted that a detailed construction plan/methodology is not available at this stage and a contractor has not been appointed. As such, the below recommendations and mitigation measures are indicative and should be further developed as part of a Construction Noise and Vibration Management Sub-Plan.

### 9.1 MECHANICAL PLANT AND EQUIPMENT NOISE MITIGATION

Mitigation measures for the mechanical plant should be considered during the design development stage to ensure compliance with the outlined criteria at the nearest sensitive receiver catchments. These mitigation measures could include but not limited to the following:

- Positioning mechanical plant away from nearby receivers
- Acoustic attenuators fitted to duct work
- Screening/acoustic louvres around mechanical plant
- Acoustic insulation within duct work

It should be noted that the noise reduction requirements will likely be refined and reduced once the mechanical plant and equipment selections and designs have been progressed further during the detailed design of the proposed development. The mitigation measures proposed at this stage of the development are conservative in nature.

### 9.2 OUTDOOR COMMUNAL SPACES

It is recommended that the following mitigation measures are considered for the outdoor communal open spaces and may also be incorporated as part of the operational management plan for the development:

- Access to the communal outdoor spaces are restricted between 7am and 10pm to ensure there is no risk of offensive noise during the night
- Signage displayed reminding residents to be considerate and minimise noise while the space is in use (i.e. no shouting, restriction on any amplified music, and that the outdoor communal space is not to be used for parties)

### 9.3 TRAFFIC AIRBORNE NOISE INTRUSION

An acoustic assessment of road noise emissions to the façade of the proposed development is required in accordance with the NSW SEPP and Development near Rail Corridors and Busy Roads – Interim Guideline, as outlined in Section 6.2. A preliminary façade noise model of the development to predict the road noise incident on the facades of the development.

Appendix A provides façade noise maps to present the predicted noise levels to the proposal from Oxford Street and South Dowling Street on each of the facades of the development.

The modelling takes into account building shielding, directivity and calculations for road noise. The incident noise level provided can be considered the “worst-case” noise level.

To simplify the acoustic façade requirements across the entire precinct, an acoustic facade type (AFT) has been assigned to typical glazing arrangements in Table 30. Refer to façade noise maps provided in Appendix A for the predicted façade noise range and Appendix C for façade type markup.

If the project internal noise limits for windows/doors open is exceeded, alternative means of ventilation is required in accordance with the requirements of the NCC (i.e. alternative ventilation system complying with AS 1668.2 and AS/NZS 3666.1). The design of the ventilation for these areas should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the NCC.

The noise-affected spaces identified in Section 7.6.3 as requiring alternative means of ventilation are based on façade noise levels presented in Appendix A. In summary:



- Sleeping areas (i.e. bedrooms) with an incident façade noise level of greater than 55dB(A)  $L_{Aeq,9hour}$  will require an alternative means of ventilation to meet the aforementioned requirements
- Other habitable areas (i.e. living rooms) with an incident façade noise level of greater than 60dB(A)  $L_{Aeq,15hour}$  will require an alternative means of ventilation to meet the aforementioned requirements

Areas not identified in Appendix B as requiring alternative means of ventilation can maintain internal amenity noise criteria with window open for natural ventilation. Note that the requirement for alternative means of ventilation does not impact any natural cross ventilation.

Detailed design of the building façade glazing and non-glazed elements, and the areas requiring alternative means of ventilation should be undertaken during the subsequent development applications to identify specific requirements to spaces located with direct line of sight to the surrounding roads.

Table 30: Acoustic Façade Categories & Glazing Arrangement

ACOUSTIC FAÇADE TYPE	REQUIRED ACOUSTIC RATING ( $R_w$ , $C_{tr}$ )	TYPICAL EQUIVALENT GLASS LITE
1	32, -3	6.38mm laminated glass
2	35, -3	10.38mm laminated glass
3	37, -3	12.76mm laminated glass

## 9.4 LOADING DOCK

The following general noise mitigation and management procedures are recommended to be integrated into the overall Operational Management Plan for the development:

- Use of the loading dock should be limited between the hours of 7am to 6pm.
- Vehicles travel at no faster than 10km/h whilst on the premises
- All service vehicle engines are to be switched off when parked or when unloading goods

## 9.5 CREATIVE CULTURAL SPACES

The following general noise mitigation and management procedures are recommended to be integrated into the overall Operational Management Plan for the creative cultural spaces within the development:

- The creative cultural ground level façade (e.g. glazing) that faces to Oxford Street should provide a minimum acoustic performance of  $R_w$  32 when closed (achievable with standard single-glazed systems, such as 6.38mm laminated glass).
- The creative cultural ground level façade (e.g. glazing) that faces out to the communal open space (in the direction of Marshall St) should provide a minimum acoustic performance of  $R_w$  37 when closed (achievable with single-glazed systems, such as 12.76mm laminated glass).
- Windows / doors of the space on the ground floor that provide external access are to stay closed, with the exception for ingress / egress of patrons.

## 9.6 EXTERNAL ENTERTAINMENT ACTIVITY NOISE

Façade mitigation measures to control external entertainment activity noise are specified in Appendix C.

## 9.7 CONSTRUCTION NOISE AND VIBRATION

### 9.7.1 General Acoustic Recommendations for Construction

According to AS 2436 – 2010 “Guide to noise and vibration control on construction, demolition and maintenance sites” the following techniques could be applied to minimize the spread of noise and vibrations to the potential receivers.

#### Noise

If a process that generates significant noise levels cannot be avoided, the amount of noise reaching the receiver should be minimized. Two ways of achieving this are to either increase the distance between the noise source and the receiver or to introduce noise reduction measures such as screens.

Physical methods to reduce the transmission of noise between the site works and residences, or other sensitive land uses, are generally suited to works where there is longer-term exposure to the noise. Practices that will reduce noise from the site include:

- Increasing the distance between noise sources and sensitive receivers;
- Reducing the line-of-sight noise transmission to residences or other sensitive land uses using temporary barriers (stockpiles, shipping containers and demountable offices can be effective barriers);
- Constructing barriers that are part of the project design early in the project to introduce the mitigation of site noise; and
- Installing purpose-built noise barriers, acoustic sheds and enclosures.

#### Screening

On sites where distance is limited, the screening of noise may be beneficial, and this should be taken into account during the planning stages.

If structures such as stores, site offices and other temporary buildings are situated between the noisiest part of the site and the nearest dwellings, some of the noise emission from the site can be reduced. If these buildings are occupied, sound insulation measures may be necessary to protect workers inside the buildings.

A hoarding that includes a site office on an elevated structure offers superior noise reduction when compared with a standard (simple) hoarding. The acoustic performance is further enhanced when the hoarding is a continuous barrier.

Storage of building materials or the placement of shipping containers between the noise source and any noise-sensitive area may also provide useful screening and the same is true of partially completed or demolished buildings. A noisy, stationary plant can be placed in a basement, the shell of which has been completed, provided reverberant noise can be controlled. Where compressors or generators are used in closed areas, it is necessary to ensure that the exhaust gases are discharged directly to the outside air and that there is good cross-ventilation to prevent the build-up of poisonous carbon monoxide fumes and to allow an adequate air supply to maintain efficiency when operating the equipment.

Where such noise barriers are not practical, a worthwhile reduction in noise can be obtained by siting the plant behind and as close as possible to mounds of earth, which may effectively screen any noise-sensitive areas from the plant. These can often be designed into the construction schedule or site arrangement for future landscaping.

Water pumps, fans and other plant equipment that operate on a 24-hour basis may not be an irritating source of noise during the day but may be problematic at night. They should therefore be effectively screened by either situating them behind a noise barrier or by being positioned in a trench or a hollow in the ground provided this does not generate reverberant noise. In such cases, however, adequate ventilation should also be ensured. Long, temporary earth embankments can provide quite an effective noise screen for mobile equipment moving, for example, on a haulage road. When the earthworks are complete, the earth mounds should be removed, if possible, with smaller, quieter excavators. A noise barrier may be a more reliable method of noise control than the imposition of restrictions on throttle settings.



In many cases it is not be practical to screen earthmoving operations effectively, but it may be possible to partially shield a construction plant or to build-in at the early stages protective features required to screen traffic noise. Where earth noise barriers are not practical due to lack of space, consideration should be given to the possibility of constructing temporary screens from wood or any equivalent material in surface density.

The usefulness of a noise barrier will depend upon its length, its height, its position relative to the source and to the receiver, and the material from which it is made. A barrier designed to reduce noise from a moving source should extend beyond the last property to be protected to a distance of not less than ten times the shortest measurement from the property to the barrier. A barrier designed to reduce noise from a stationary source should, where possible, extend to a distance beyond the direct line between the noise source and the receiver to a distance equal to ten times the effective barrier height, which is the height above the direct line between source and receiver.

If the works are predominately within nominally closed structures, careful consideration should be given to reducing noise breakout at any openings.

#### **Crane (diesel operated)**

An appropriate silencer on the muffler and acoustic screen around the engine bay are recommended to attenuate the noise from it.

#### **Reversing and warning alarms**

Community complaints often involve the intrusive noise of alarms commonly used to provide a safe system of work for vehicles operating on a site. Beeper reversing alarm noise is generally tonal and may cause annoyance at significant distances from the work site.

There are alternative warning alarms capable of providing a safe system of work that are equal to or better than the traditional 'beeper', while also reducing environmental noise impacts. The following alternatives should be considered for use on construction sites as appropriate:

- Broadband audible alarms incorporating a wide range of sound frequencies (as opposed to the tonal frequency 'beep') are less intrusive when heard in the neighbourhood;
- Variable-level alarms reduce the emitted noise levels by detecting the background noise level and adjusting the alarm level accordingly;
- Non-audible warning systems (e.g. flashing lights, reversing cameras) may also be employed, providing safety considerations, are not compromised;
- Proximity alarms that use sensors to determine the distance from objects, such as people or structures, and generate an audible alarm in cabin for the driver; and
- Spotters or observers.

The above methods should be combined, where appropriate.

### **9.7.2 Noise & Vibration Monitoring Strategy**

#### **General Methodology**

Noise and vibration levels should be monitored from time to time to ensure that noise generated as a result of remediation and construction activities does not disturb local businesses and residents.

Monitoring may be in the form of regular checks by the builder or indirectly by an acoustic consultant engaged by the builder and in response to any noise or vibration complaints. Where noise and vibration criteria are being exceeded or in response to valid complaints, noise and / or vibration monitoring should be undertaken. This would be performed inside the premises of the affected property and on site adjacent to the affected receivers.

Monitoring is to be undertaken by an experienced noise and vibration monitoring professional or an acoustic consultant. The results of any noise or vibration monitoring are to be provided to the relevant party or person in a timely manner allowing the builder to address the issue and respond to the complaints.

Noise and vibration monitoring can take two forms:



- Short term monitoring; and
- Long-term monitoring.

### **Short-term monitoring**

Short-term monitoring consists of attended monitoring when critical stages of the construction are occurring. This normally provides real-time assistance and guidance to the subcontractor on site letting them know when the noise and vibration criteria are exceeded allowing the selection of alternative method on construction or equipment selection in order to minimise noise and vibration impacts.

### **Long-term monitoring**

Similarly, long-term monitoring uses noise and vibration loggers providing real-time alerts to the builder / site manager when the noise and vibration criteria are exceeded.

Typically, the noise and vibration loggers stay on site for a period of several months for the critical construction stages of the project. Sometimes the period of construction noise and vibration monitoring is dictated by the local authorities.

Both methodologies are complementary and normally used simultaneously providing a significant amount of data via the long-term monitoring but also providing information on the sources of noise and vibration generating exceedances via the short-term or attended monitoring.

### **Proposed Monitoring Programme**

A monitoring programme is recommended to be carried out as part of a Construction Noise and Vibration Management Sub-Plan, once construction plans/methodologies are available and a contractor is appointed.

# 10 CONCLUSION

This Noise and Vibration Impact Report has been prepared by E-LAB Consulting to accompany a State Significant Development Application (SSD-87245208) for the proposed mixed-use development at 13-15, 17 Oxford Street, and 2 Verona Street, Paddington. This Noise and Vibration Impact Assessment specifically responds to the requirements of Item 10 of the SEAR's (SSD-87245208) issued for the project by DPHI on 15 July 2025.

Further to the above, Revision 5 of this report prepared 22<sup>nd</sup> May 2026 has been updated to address the RFI's relating to Revision 4 received from the City of Sydney Council and NSW 24-Hour Economy Commissioner. As per the Response to Acoustic RFI's letter date 22<sup>nd</sup> May 2026, Section 7.7 of this report includes an assessment of existing and future external entertainment activity noise. Mitigation measures are outlined in Section 9.6 to ensure compliance with the internal noise targets established in Section 6.2.3.

The assessment has considered the following key acoustic elements:

- Noise impacts from major roads on the proposed development;
- Noise impacts from the operation of the development on surrounding noise sensitive receivers; and
- Noise and vibration impacts from construction activities associated with the development on surrounding noise sensitive receivers.

To assess each of the acoustic considerations for the proposed development, noise criteria has been established in Section 6 in accordance with the following documents:

- AS/NZS 2107:2016 "Acoustics - Recommended design sound levels and reverberation times for building interiors";
- Development Near Rail Corridors and Busy Roads – Interim Guideline;
- NSW 24-Hour Economy Commissioner Acoustic Toolkit;
- City of Sydney Special Entertainment Precincts Management Plan (Draft 2026);
- NSW Road Noise Policy (RNP), 2011;
- NSW Noise Policy for Industry (NPI) 2017;
- Interim Construction Noise Guideline (ICNG) 2009;
- Assessing vibration: A Technical Guideline 2006;
- British Standard BS5228 – Part 1:1997 "Noise and Vibration Control on Construction and Open Sites.";
- British Standard BS7385:1993 "Evaluation and Measurement for Vibration in Buildings"; and
- German Standard DIN4150 – Part 3: "Structural vibration in buildings – Effects on structures".

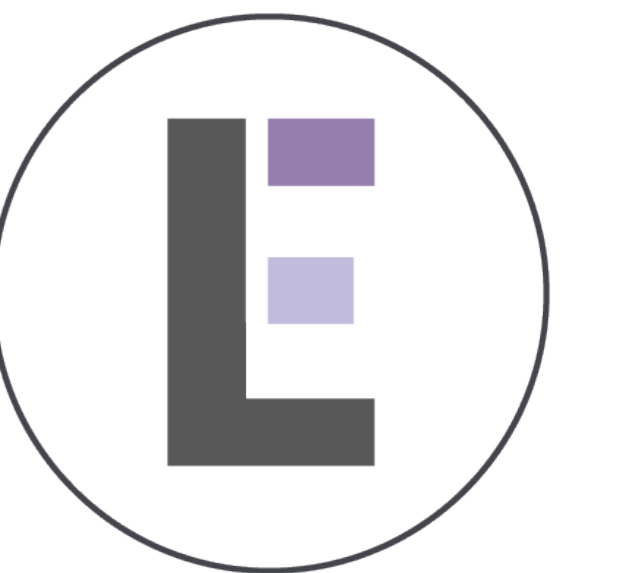
Having given regard to the analysis conducted within this report, it is the finding of this noise and vibration impact assessment that the proposed redevelopment is compliant with the relevant noise and vibration criteria controls for this type of development, and it is expected to comply with the applicable regulations with regards to noise and vibration, particularly those listed above.

It is recommended the SSDA be approved subject to the implementation of the mitigation measures outlined in this report.



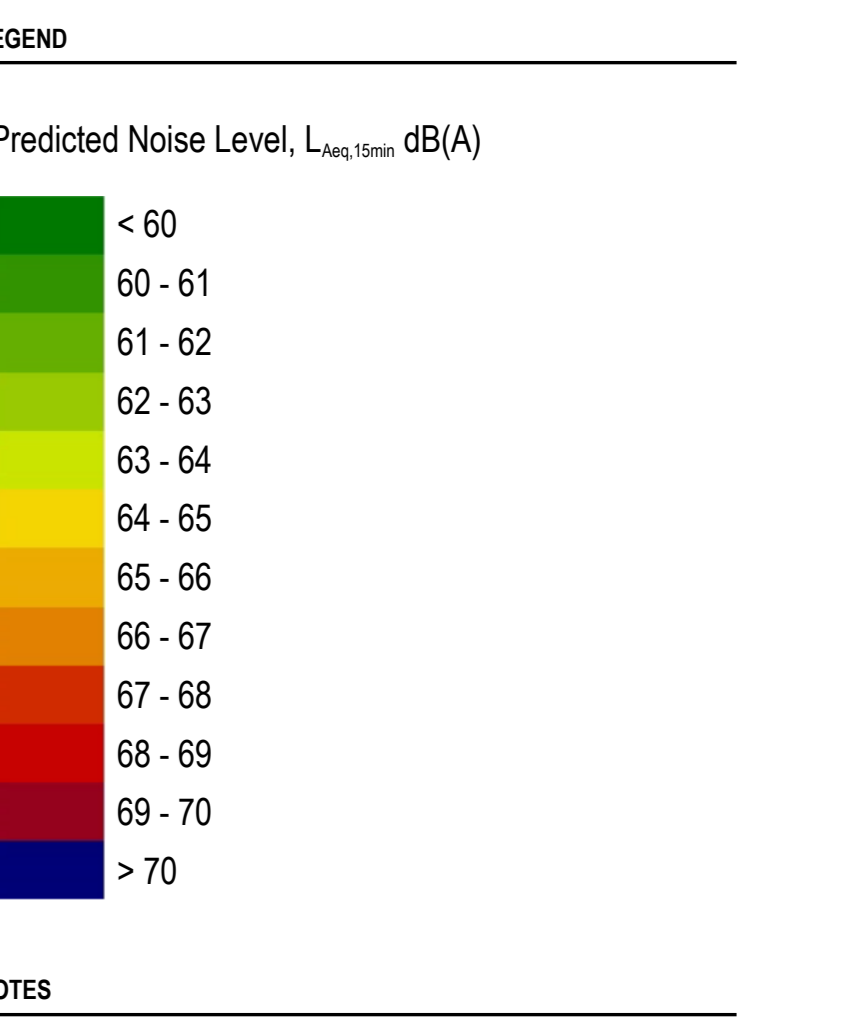
## Appendix A **Façade Noise Map**



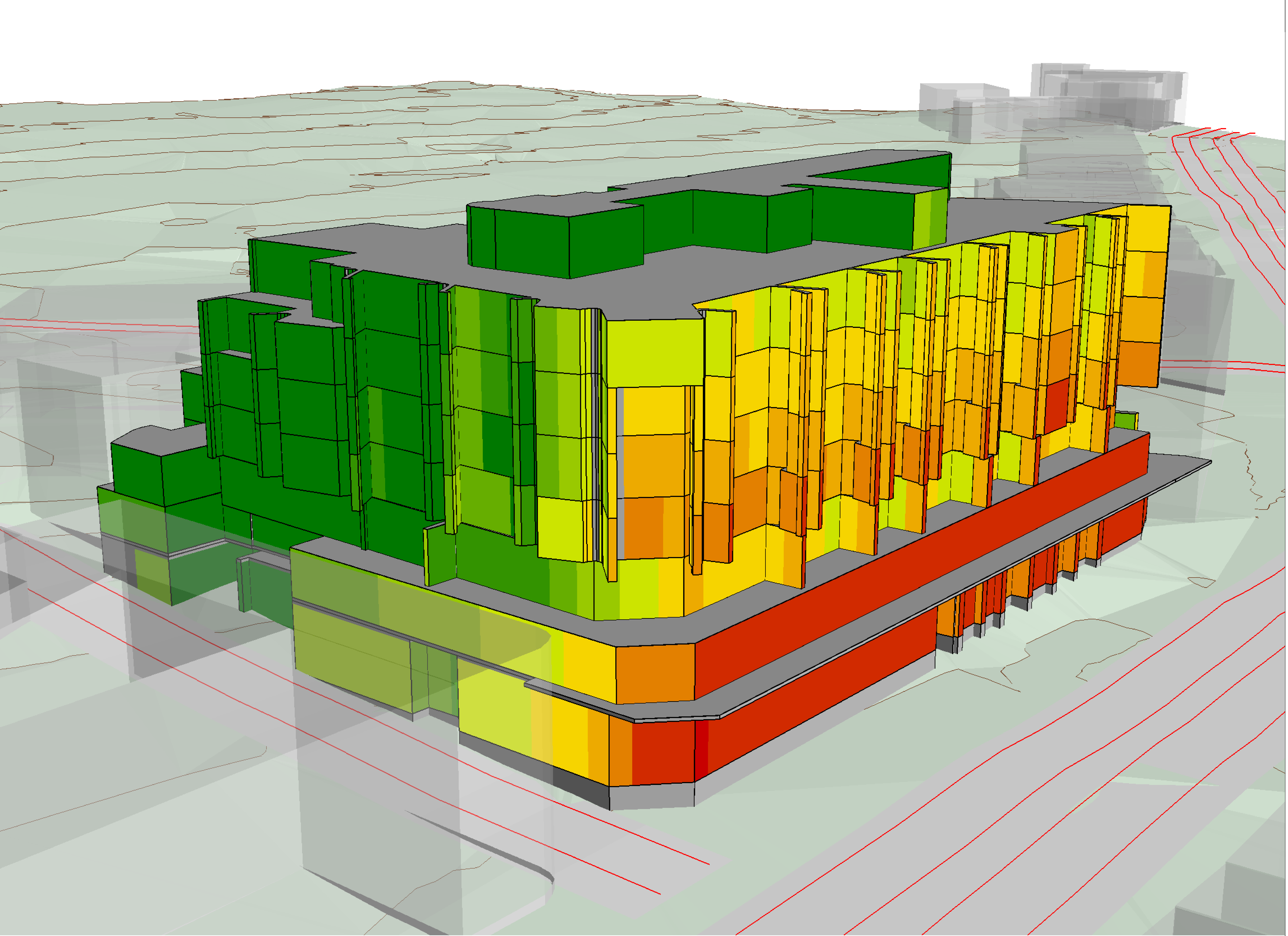


E-LAB CONSULTING

ISSUE	DATE	STATUS
1	2011/02/05	FOR SSDA
2	14/04/2016	FOR SSDA



NOTES



PROJECT  
13-17 OXFORD STREET, PADDINGTON

PROJECT NO.  
P02598

ARCHITECT  
TZG

CLIENT  
WT MALOUF

SCALE  
N.T.S.

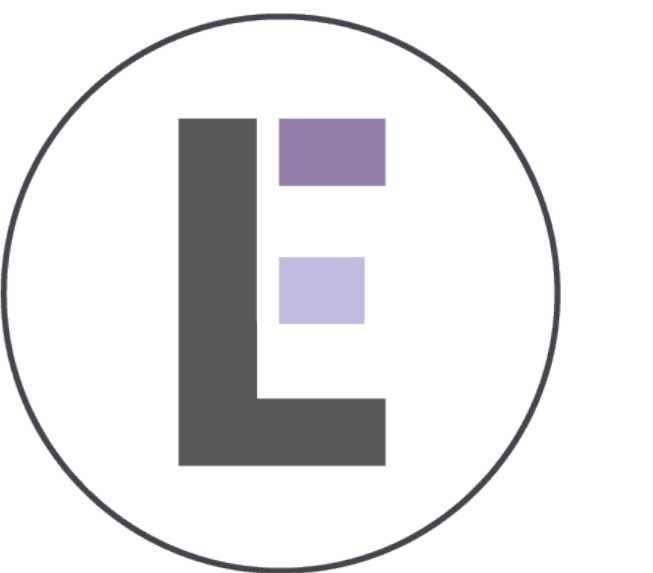
STATUS  
FOR SSDA

DRAWING  
FACADE NOISE MAP  
DAY - VIEW 1

DISCIPLINE  
ACOUSTICS AND VIBRATION

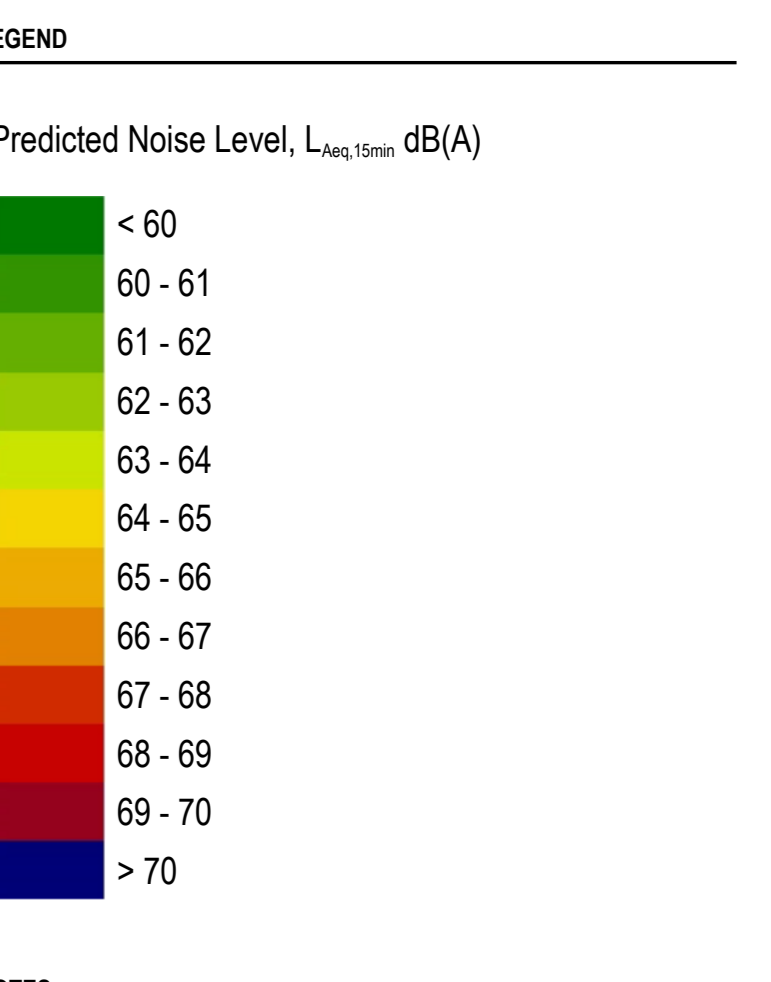
DRAWING NUMBER  
AC-DWG-100-01-01

REVISION  
002

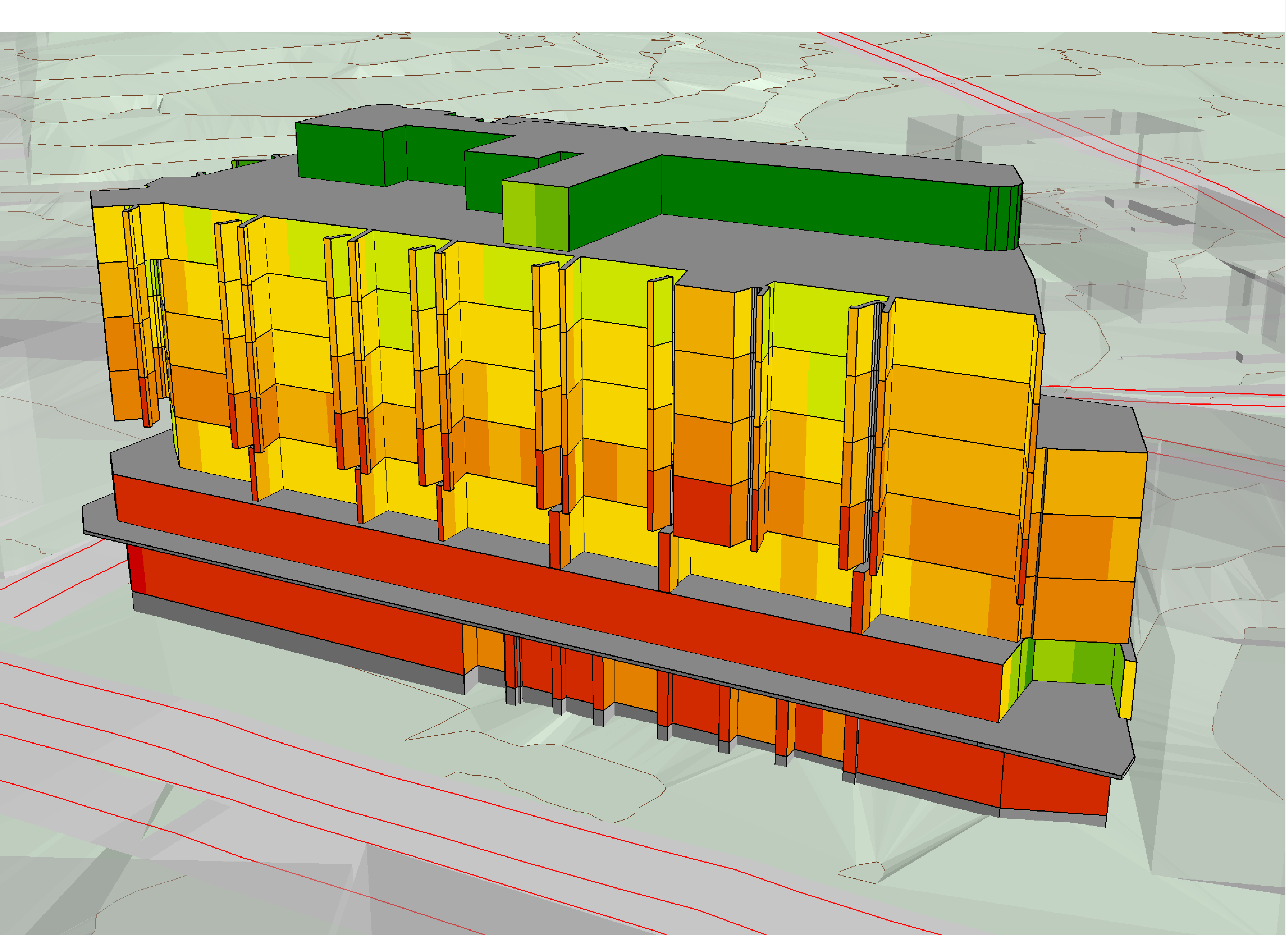


E-LAB CONSULTING

ISSUE	DATE	STATUS
1	2011/02/05	FOR SSDA
2	14/04/2016	FOR SSDA

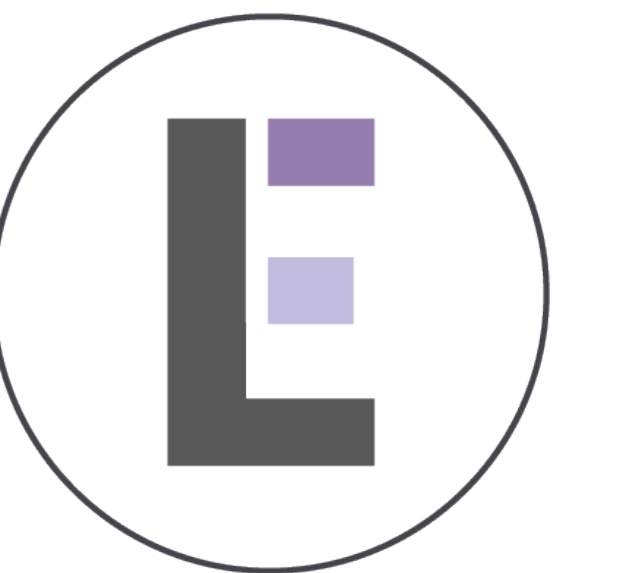


NOTES



PROJECT	13-17 OXFORD STREET, PADDINGTON
PROJECT NO.	P02598
ARCHITECT	TZG
CLIENT	WT MALOUF
SCALE	NTS
STATUS	FOR SSDA
DRAWING	FACADE NOISE MAP
	DAY - VIEW 2
DISCIPLINE	ACOUSTICS AND VIBRATION
DRAWING NUMBER	AC-DWG-100-02-01
REVISION	002





E-LAB CONSULTING

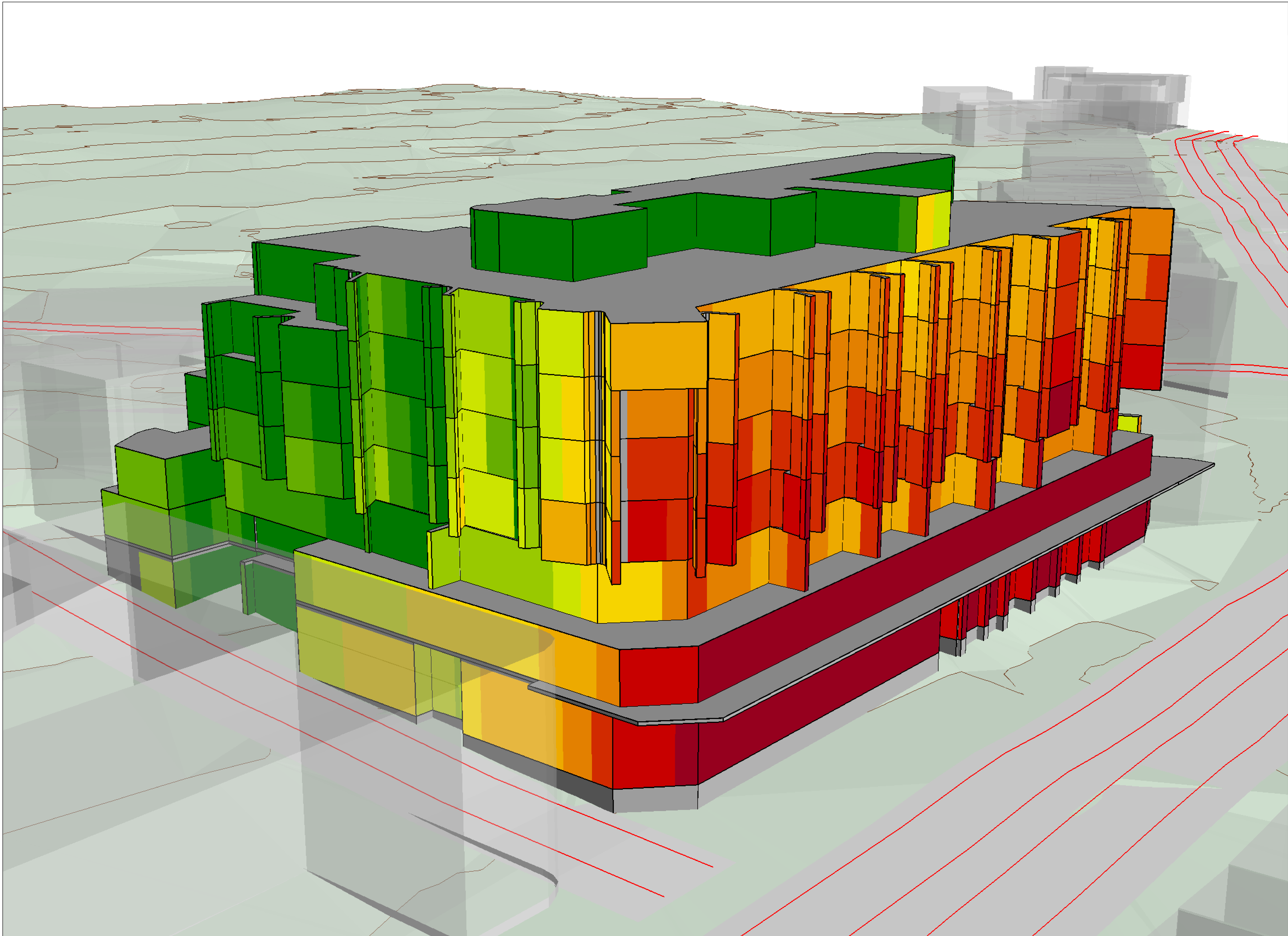
ISSUE	DATE	STATUS
1	2011/02/05	FOR SDA
2	14/04/2016	FOR SDA

LEGEND

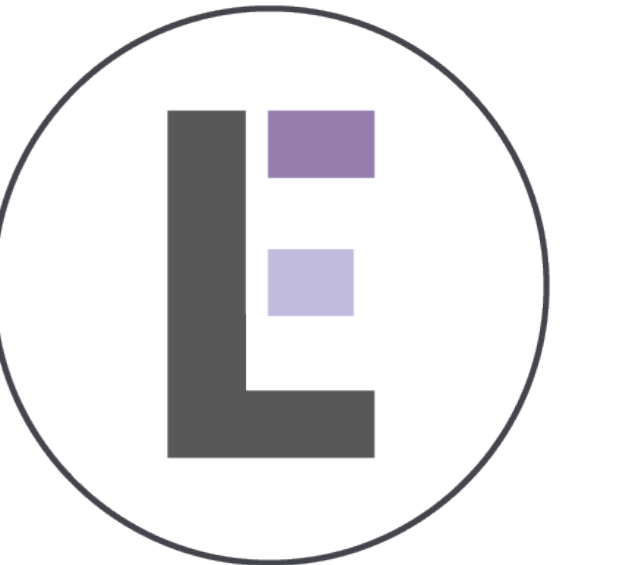
Predicted Noise Level,  $L_{Aeq,Tmax}$  (dB(A))

Green	< 55
Light Green	55 - 56
Yellow-Green	56 - 57
Yellow	57 - 58
Light Orange	58 - 59
Orange	59 - 60
Dark Orange	60 - 61
Red-Orange	61 - 62
Red	62 - 63
Dark Red	63 - 64
Very Dark Red	64 - 65
Blue	> 65

NOTES

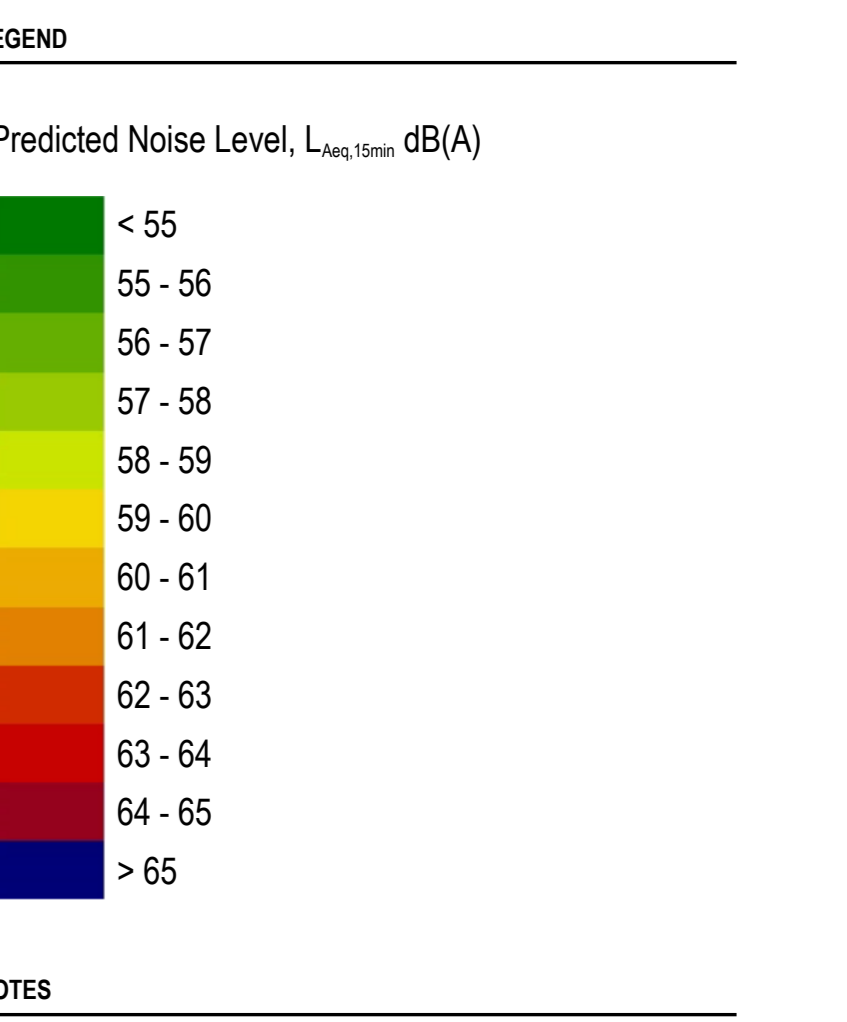


PROJECT	13-17 OXFORD STREET, PADDINGTON
PROJECT NO.	P02598
ARCHITECT	TZG
CLIENT	WT MALOUF
SCALE	NTS
STATUS	FOR SDA
DRAWING	FACADE NOISE MAP
	NIGHT - VIEW 1
DISCIPLINE	ACOUSTICS AND VIBRATION
DRAWING NUMBER	AC-DWG-100-04-01
REVISION	002

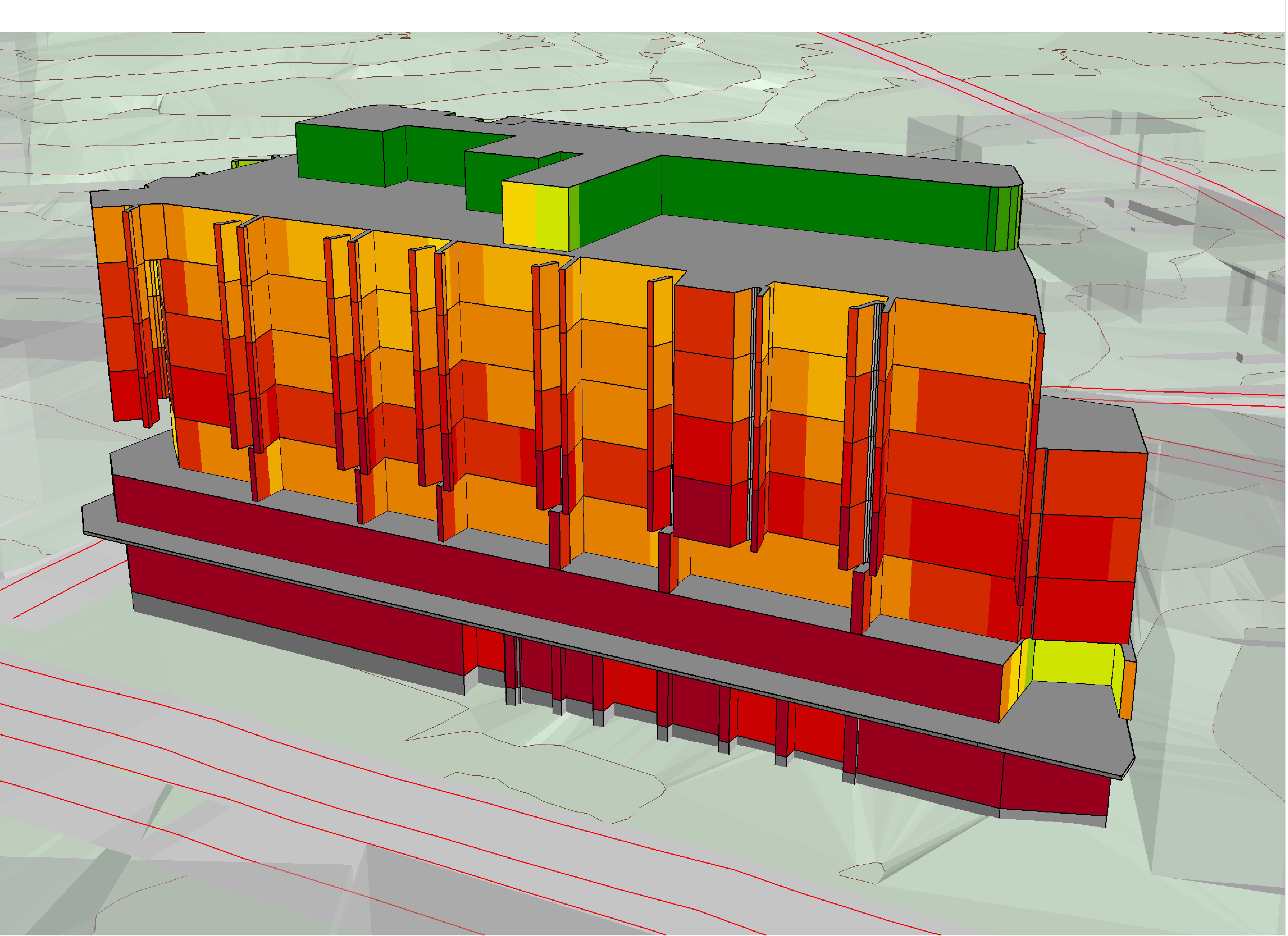


E-LAB CONSULTING

ISSUE	DATE	STATUS
1	20/11/2025	FOR SDA
2	14/04/2026	FOR SDA



NOTES



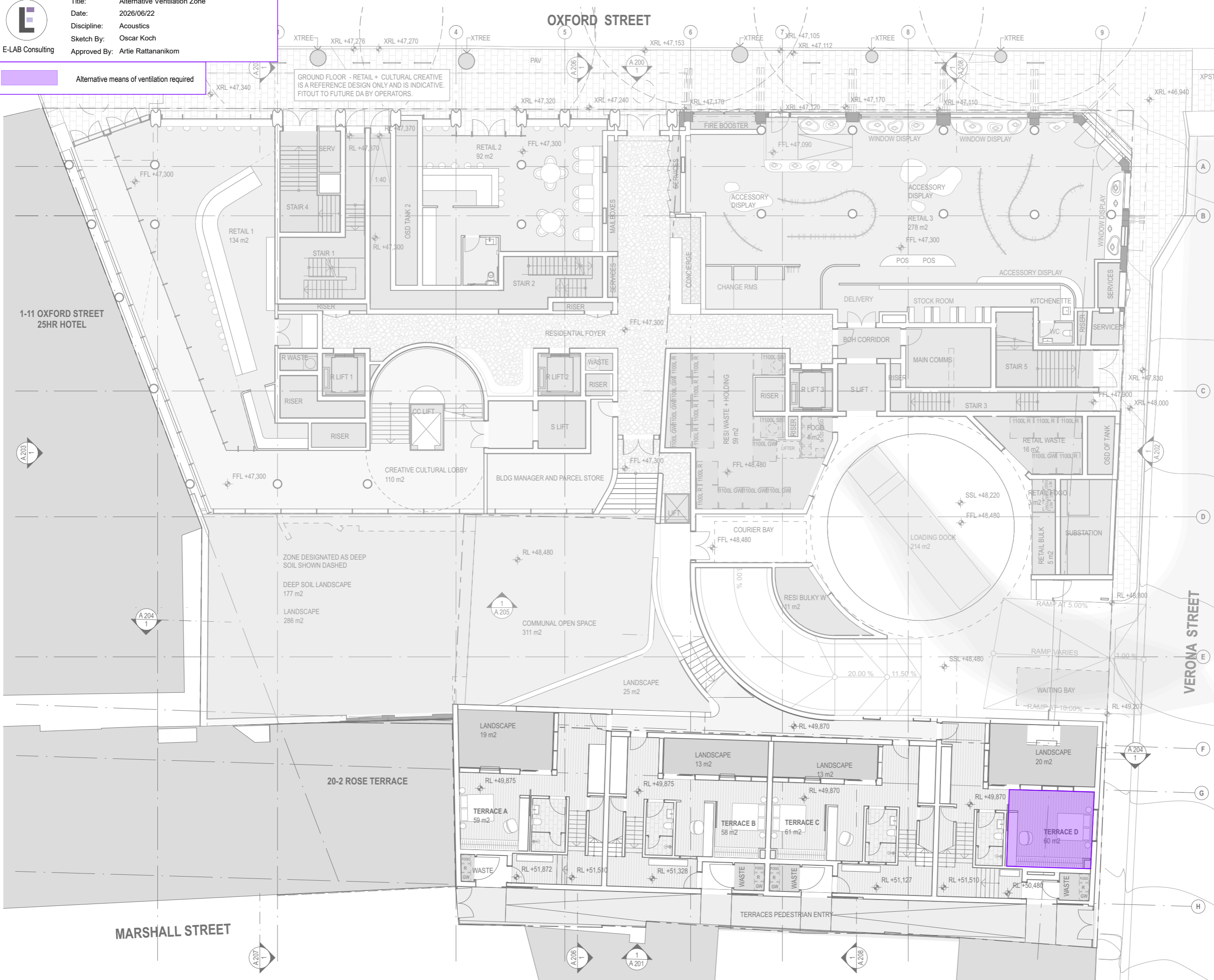
PROJECT	13-17 OXFORD STREET, PADDINGTON
PROJECT NO.	P02598
ARCHITECT	TZG
CLIENT	WT MALOUF
SCALE	NTS
STATUS	FOR SDA
DRAWING	FACADE NOISE MAP
	NIGHT - VIEW 2
DISCIPLINE	ACOUSTICS AND VIBRATION
DRAWING NUMBER	AC-DWG-100-05-01
REVISION	002



## Appendix B **Alternative Ventilation Markup**



Alternative means of ventilation required



DATE	REV	DESCRIPTION
17/11/2025	-	For SSDA
7/4/2026	A	For SSDA
22/5/2026	B	For SSDA

Do not scale off drawings or use CAD files for any set-out, shop-drawing production or construction. Use figured dimensions only. Check all measurements on site and report any discrepancies to the architect. These designs, plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner Urbis	Civil + Stormwater Telford Civil
Landscape Architect Wyer & Co	Geotech EI Australia
Structure Northop	BCA BCAlign
Building Services O&S Consulting	Traffic JMT Consulting
Basix + ESD Credwell	Waste Elephants Foot
Fire + Acoustic E-Lab	Access Purple Apple

**Architects**  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tzg.com.au  
 E info@tzg.com.au

**Client**  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

**Project**  
**Verona, Paddington**

**Phase**  
**SSDA**

**Job No.**  
 24026

**Drawing Title**  
**TERRACES GROUND FLOOR PLAN**

**Drawing No.**  
 A 105

**Rev**  
 B

**Drawn**  
 AM, IR, CY

**Date**  
 22/05/2026

**Checked**  
 TG

**Scale**  
 0 2 4 8 m @A3  
 1:200@A3

Nominated Architects  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603

E-LAB Consulting  
Alternative means of ventilation required

**OXFORD STREET**



DATE	REV	DESCRIPTION
17/11/2025	-	For SSDA
7/4/2026	A	For SSDA
22/5/2026	B	For SSDA

Do not scale off drawings or use CAD files for any set-out, shop-drawing production or construction. Use figured dimensions only. Check all measurements on site and report any discrepancies to the architect. These designs, plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner Urbis	Civil + Stormwater Telford Civil
Landscape Architect Wyer & Co	Geotech EI Australia
Structure Northop	BCA BCAlign
Building Services O&S Consulting	Traffic JMT Consulting
Basix + ESD Credwell	Waste Elephants Foot
Fire + Acoustic E-Lab	Access Purple Apple

**Architects**  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tzg.com.au  
 E info@tzg.com.au

**Client**  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

**Project**  
**Verona, Paddington**

**Phase**  
**SSDA**

**Job No.**  
 24026

**Drawing Title**  
**LEVEL 1 FLOOR PLAN**

**Drawing No.** A 106  
**Rev** B

**Drawn** AM, IR, CY  
**Date** 22/05/2026

**Checked**  
 TG

**Scale** 1:200@A3  
 0 2 4 8 m @A3

**Nominated Architects**  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603

1-11 OXFORD STREET  
25HR HOTEL

20-2 ROSE TERRACE

VERONA STREET

MARSHALL STREET



Title: Alternative Ventilation Zone  
 Date: 2026/06/22  
 Discipline: Acoustics  
 Sketch By: Oscar Koch  
 Approved By: Artie Rattananikom

E-LAB Consulting  
 Alternative means of ventilation required

OXFORD STREET

DATE	REV	DESCRIPTION
17/11/2025	-	For SSDA
7/4/2026	A	For SSDA
22/5/2026	B	For SSDA

Do not scale off drawings or use CAD files for any set-out, shop-drawing production or construction. Use figured dimensions only. Check all measurements on site and report any discrepancies to the architect. These designs, plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater Telford Civil
Landscape Architect	Geotech EI Australia
Structure	BCA BCAlign
Building Services	Traffic JMT Consulting
Basix + ESD	Waste Elephants Foot
Fire + Acoustic	Access Purple Apple

Architects  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tzg.com.au  
 E info@tzg.com.au

Client  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

Project  
**Verona, Paddington**

Phase  
**SSDA**

Job No.  
 24026

Drawing Title  
**LEVEL 2 FLOOR PLAN**

Drawing No.  
**A 107**

Rev  
**B**

Drawn  
**AM, IR, CY**

Date  
**22/05/2026**

Checked  
**TG**

Scale  
 0 2 4 8 m @A3  
 1:200@A3

Nominated Architects  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603



VERONA STREET

MARSHALL STREET

20-2 ROSE TERRACE

TERRACE A  
56 m<sup>2</sup>

TERRACE B  
62 m<sup>2</sup>

TERRACE C  
63 m<sup>2</sup>

TERRACE D  
58 m<sup>2</sup>

1-11 OXFORD STREET  
25HR HOTEL

2.01 BALCONY  
17 m<sup>2</sup>

2.02 BALCONY  
25 m<sup>2</sup>

2.04 BALCONY  
15 m<sup>2</sup>

2.05 BALCONY  
17 m<sup>2</sup>

2.06 BALCONY  
12 m<sup>2</sup>

2.07 BALCONY  
17 m<sup>2</sup>

2.08 BALCONY  
57 m<sup>2</sup>

2.01  
3 BED  
150 m<sup>2</sup>

2.02  
2 BED  
82 m<sup>2</sup>

2.04  
2 BED  
114 m<sup>2</sup>

2.05  
2 BED  
118 m<sup>2</sup>

2.06  
2 BED  
102 m<sup>2</sup>

2.07  
1 BED  
64 m<sup>2</sup>

2.08  
3 BED  
117 m<sup>2</sup>

2.03  
1 BED+  
70 m<sup>2</sup>

2.01 BALCONY  
8 m<sup>2</sup>

2.03 BALCONY  
9 m<sup>2</sup>

2.09  
1 BED  
61 m<sup>2</sup>

2.09 BALCONY  
16 m<sup>2</sup>


2.11 BALCONY  
11 m<sup>2</sup>

2.11  
2 BED  
72 m<sup>2</sup>

2.10 BALCONY  
9 m<sup>2</sup>

2.10  
2 BED  
130 m<sup>2</sup>

2.10 BALCONY  
6 m<sup>2</sup>

 E-LAB Consulting  
Alternative means of ventilation required



DATE	REV	DESCRIPTION
17/11/2025	-	For SSDA
7/4/2026	A	For SSDA
22/5/2026	B	For SSDA

Do not scale off drawings or use CAD files for any set-out, shop-drawing production or construction. Use figured dimensions only. Check all measurements on site and report any discrepancies to the architect. These designs, plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater
Urbs	Telford Civil
Landscape Architect	Geotech
Wyer & Co	Ei Australia
Structure	BCA
Northop	BCAlign
Building Services	Traffic
O&S Consulting	JMT Consulting
Basix + ESD	Waste
Credwell	Elephants Foot
Fire + Acoustic	Access
E-Lab	Purple Apple

**Architects**  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tgz.com.au  
 E info@tgz.com.au

**Client**  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

**Project**  
**Verona, Paddington**

**Phase**  
**SSDA**

**Job No.**  
 24026

**Drawing Title**  
**LEVEL 3 FLOOR PLAN**

**Drawing No.**  
**A 108**

**Rev**  
**B**

**Drawn**  
**AM, IR, CY**

**Date**  
**22/05/2026**

**Checked**  
**TG**

**Scale**  
 0 2 4 8 m @A3  
 1:200@A3

**Nominated Architects**  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603



Title: Alternative Ventilation Zone  
 Date: 2026/06/22  
 Discipline: Acoustics  
 Sketch By: Oscar Koch  
 Approved By: Artie Rattananikom

E-LAB Consulting  
 Alternative means of ventilation required

OXFORD STREET

DATE	REV	DESCRIPTION
17/11/2025	-	For SSDA
7/4/2026	A	For SSDA
22/5/2026	B	For SSDA

Do not scale off drawings or use CAD files for any set-out, shop-drawing production or construction. Use figured dimensions only. Check all measurements on site and report any discrepancies to the architect. These designs, plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater Telford Civil
Landscape Architect	Geotech EI Australia
Structure	BCA BCAlign
Building Services	Traffic JMT Consulting
Basix + ESD	Waste Elephants Foot
Fire + Acoustic	Access Purple Apple

Architects  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tzg.com.au  
 E info@tzg.com.au

Client  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

Project  
**Verona, Paddington**

Phase  
**SSDA**

Job No.  
 24026

Drawing Title  
**LEVEL 4 FLOOR PLAN**

Drawing No.  
**A 109**

Rev  
**B**

Drawn  
**AM, IR, CY**

Date  
**22/05/2026**

Checked  
**TG**

Scale  
 0 2 4 8 m @A3  
 1:200@A3

Nominated Architects  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603



VERONA STREET

20-2 ROSE TERRACE

MARSHALL STREET

E-LAB Consulting  
 Alternative means of ventilation required

DATE	REV	DESCRIPTION
17/11/2025	-	For SSDA
7/4/2026	A	For SSDA
22/5/2026	B	For SSDA

Do not scale off drawings or use CAD files for any set-out, shop-drawing production or construction. Use figured dimensions only. Check all measurements on site and report any discrepancies to the architect. These designs, plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater Telford Civil
Landscape Architect	Geotech EI Australia
Structure	BCA BCAlign
Building Services	Traffic JMT Consulting
Basix + ESD	Waste Elephants Foot
Fire + Acoustic	Access Purple Apple

**Architects**  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tgz.com.au  
 E info@tgz.com.au

**Client**  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

**Project**  
**Verona, Paddington**

**Phase**  
**SSDA**

**Job No.**  
 24026

**Drawing Title**  
**LEVEL 5 FLOOR PLAN**

**Drawing No.**  
**A 110**

**Rev**  
**B**

**Drawn**  
**AM, IR, CY**

**Date**  
**22/05/2026**

**Checked**  
**TG**

**Scale**  
 0 2 4 8 m @A3  
 1:200@A3

**Nominated Architects**  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603



VERONA STREET

SETBACK TO 2 VERONA STREET BOUNDARY

MARSHALL STREET

20-2 ROSE TERRACE

OXFORD STREET

1-11 OXFORD STREET  
25HR HOTEL



Title: Alternative Ventilation Zone  
 Date: 2026/06/22  
 Discipline: Acoustics  
 Sketch By: Oscar Koch  
 Approved By: Artie Rattananikom

E-LAB Consulting  
 Alternative means of ventilation required

OXFORD STREET



DATE	REV	DESCRIPTION
17/11/2025	-	For SSDA
7/4/2026	A	For SSDA
22/5/2026	B	For SSDA

Do not scale off drawings or use CAD files for any set-out, shop-drawing production or construction. Use figured dimensions only. Check all measurements on site and report any discrepancies to the architect. These designs, plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner Urbis	Civil + Stormwater Telford Civil
Landscape Architect Wyer & Co	Geotech EI Australia
Structure Northop	BCA BCAlign
Building Services O&S Consulting	Traffic JMT Consulting
Basix + ESD Credwell	Waste Elephants Foot
Fire + Acoustic E-Lab	Access Purple Apple

Architects  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tzg.com.au  
 E info@tzg.com.au

Client  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

Project  
**Verona, Paddington**

Phase  
**SSDA**

Job No.  
 24026

Drawing Title  
**LEVEL 6 FLOOR PLAN**

Drawing No.  
**A 111**

Rev  
**B**

Drawn  
**AM, IR, CY**

Date  
**22/05/2026**

Checked  
**TG**

Scale  
 0 2 4 8 m @A3  
 1:200@A3

Nominated Architects  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603

1-11 OXFORD STREET  
 25HR HOTEL

20-2 ROSE TERRACE

MARSHALL STREET

VERONA STREET

11/497  
 SETBACK TO 2 VERONA STREET BOUNDARY

## Appendix C **Façade Glazing Markup**





OXFORD STREET

**E-LAB Consulting**

Title: Acoustic Facade Types  
 Date: 2026/05/22  
 Discipline: Acoustics  
 Sketch By: Oscar Koch  
 Approved By: Artie Rattanakom

**Legend**

- Acoustic Facade Type 1
- Acoustic Facade Type 2
- Acoustic Facade Type 3

Do not scale shop-drawing dimensions or report any discrepancies, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater Telford Civil
Landscape Architect	Geotech Ei Australia
Structure	BCA BCAAlign
Building Services	Traffic JMT Consulting
Basix + ESD	Waste Elephants Foot
Fire + Acoustic	Access Purple Apple

Architects  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tzg.com.au  
 E info@tzg.com.au

Client  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

Project  
**Verona, Paddington**

Phase  
**SSDA**

Job No.  
 24026

Drawing Title  
**LEVEL 1 FLOOR PLAN**

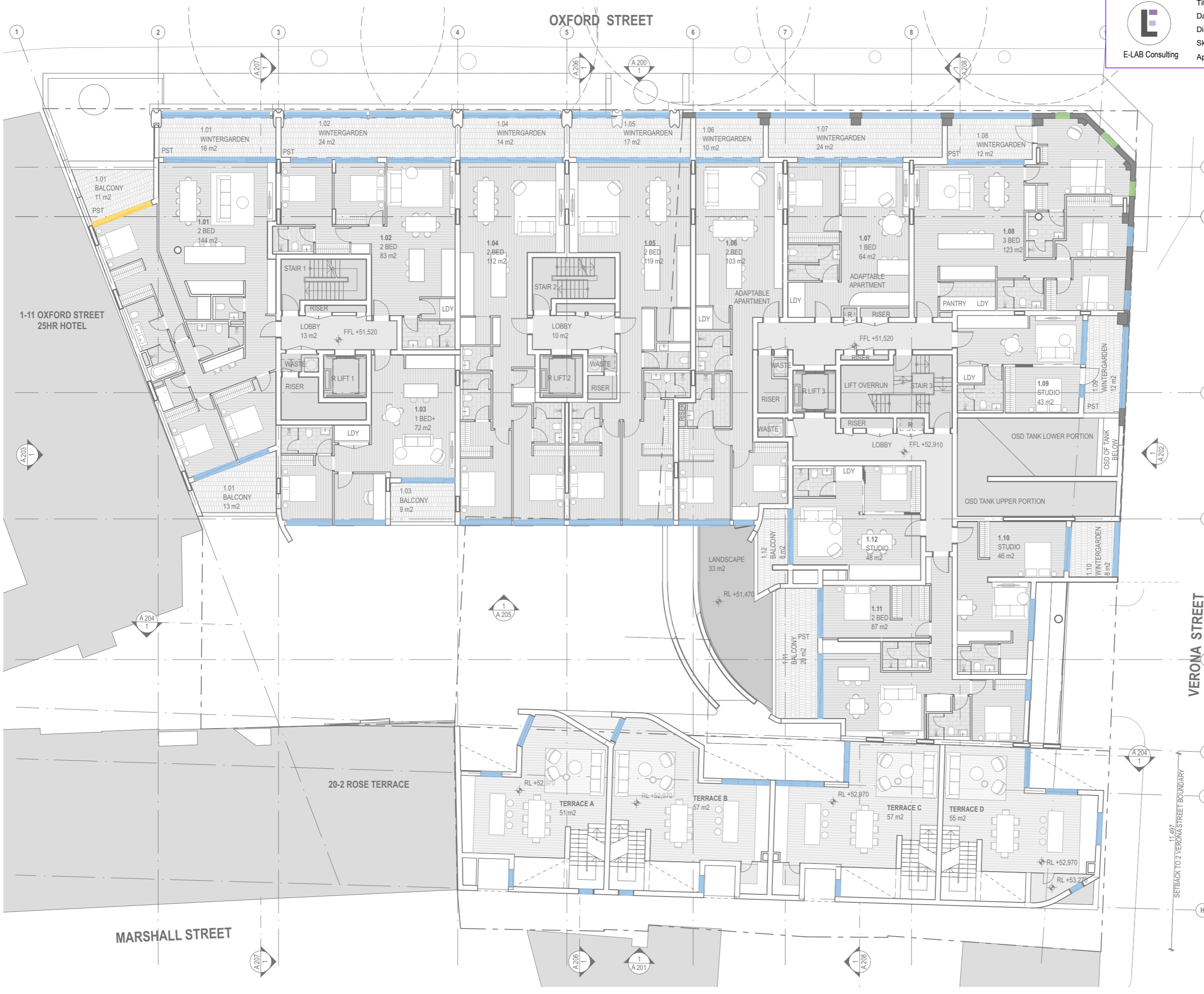
Drawing No.  
**A 106**

Drawn  
**AM, IR, CY**

Checked  
**TG**

Scale  
 1:200@A3  
 0 2 4 8 m @A3

Nominated Architects  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603



MARSHALL STREET

VERONA STREET

20-2 ROSE TERRACE

1-11 OXFORD STREET  
 25HR HOTEL

11.487  
 SETBACK TO 2 VERONA STREET BOUNDARY



OXFORD STREET

**E**  
E-LAB Consulting

Title: Acoustic Facade Types  
Date: 2026/05/22  
Discipline: Acoustics  
Sketch By: Oscar Koch  
Approved By: Artie Rattananikom

**Legend**

- Acoustic Facade Type 1
- Acoustic Facade Type 2
- Acoustic Facade Type 3

Do not scale shop-drawing dimensions or report any discrepancies. The plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater Telford Civil
Landscape Architect	Geotech EI Australia
Structure	BCA BCAlign
Building Services	Traffic JMT Consulting
Basix + ESD	Waste Elephants Foot
Fire + Acoustic	Access Purple Apple

Architects  
**TonkinZulaikhaGreer**  
117 Reservoir Street  
Surry Hills NSW 2010  
Australia  
ABN 46 002 722 349  
T +61 2 9215 4900  
W tzg.com.au  
E info@tzg.com.au

Client  
**WT Malouf**  
Suite 1.03, 2-8 Elizabeth Street  
Paddington NSW 2021  
Australia  
T 02 9331 4000  
E -

Project  
**Verona, Paddington**

Phase  
**SSDA**

Job No.  
24026

Drawing Title  
**LEVEL 3 FLOOR PLAN**

Drawing No. **A 108** Rev **B**

Drawn **AM, IR, CY** Date **22/05/2026**

Checked **TG**

Scale **1:200@A3**  
0 2 4 8 m @A3

Nominated Architects  
Peter Tonkin NSW Registration 4147  
Tim Greer NSW Registration 5603



VERONA STREET

MARSHALL STREET

20-2 ROSE TERRACE

1-11 OXFORD STREET  
25HR HOTEL

Legend	
<span style="color: blue;">■</span>	Acoustic Facade Type 1
<span style="color: green;">■</span>	Acoustic Facade Type 2
<span style="color: yellow;">■</span>	Acoustic Facade Type 3

Do not scale shop-drawing dimensions or report any details, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater
Urbis	Telford Civil
Landscape Architect	Geotech
Wyer & Co	EI Australia
Structure	BCA
Northop	BCAlign
Building Services	Traffic
O&S Consulting	JMT Consulting
Basix + ESD	Waste
Credwell	Elephants Foot
Fire + Acoustic	Access
E-Lab	Purple Apple

**Architects**  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tzg.com.au  
 E info@tzg.com.au

**Client**  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

**Project**  
**Verona, Paddington**

**Phase**  
**SSDA**

**Job No.**  
 24026

**Drawing Title**  
**LEVEL 4 FLOOR PLAN**

**Drawing No.**  
 A 109

**Rev**  
 B

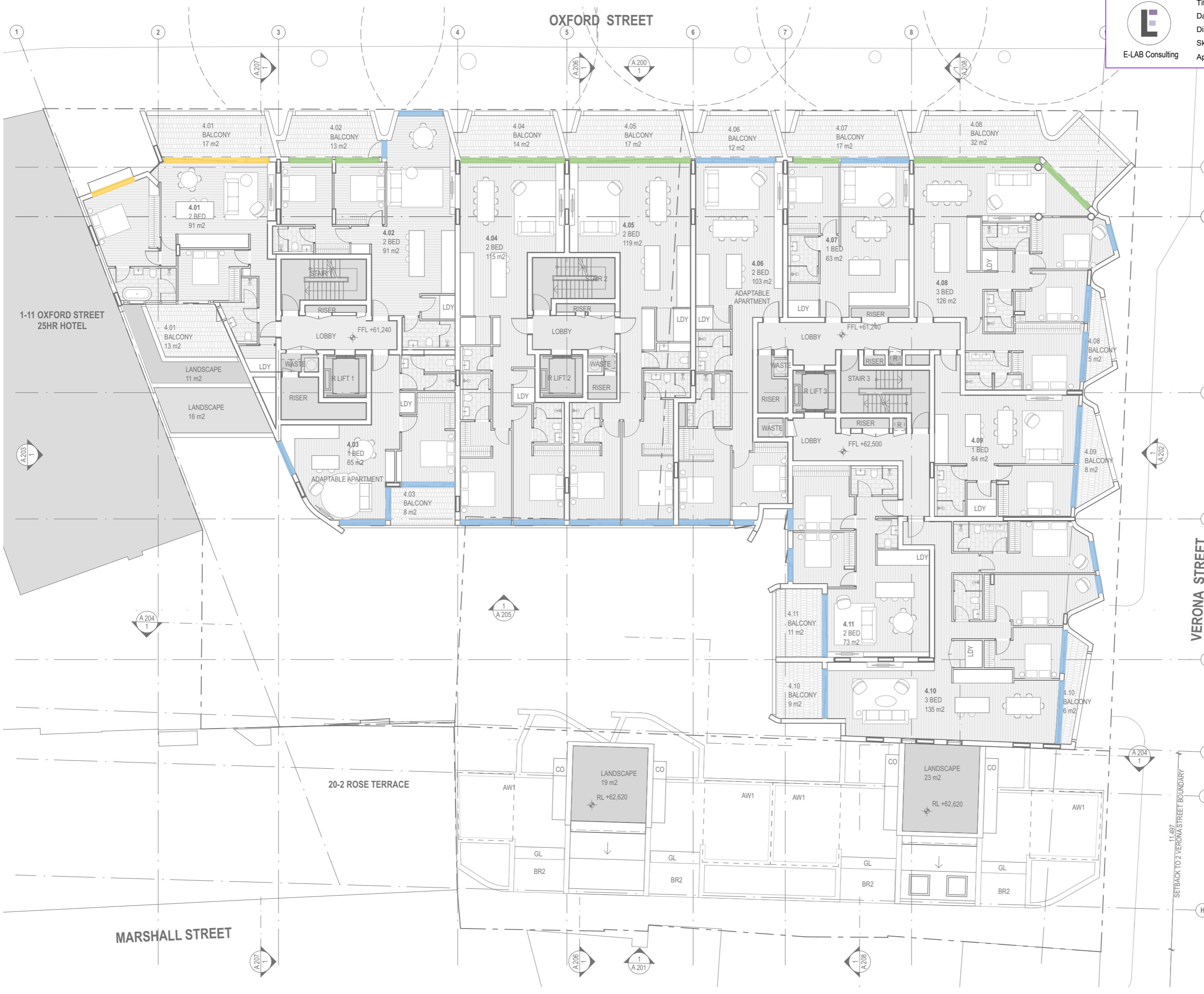
**Drawn**  
 AM, IR, CY

**Date**  
 22/05/2026

**Checked**  
 TG

**Scale**  
 0 2 4 8 m @A3  
 1:200@A3

**Nominated Architects**  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603



VERONA STREET

SETBACK TO 2 VERONA STREET BOUNDARY

MARSHALL STREET

20-2 ROSE TERRACE

OXFORD STREET

1-11 OXFORD STREET  
25HR HOTEL

Legend	
<span style="color: blue;">█</span>	Acoustic Facade Type 1
<span style="color: green;">█</span>	Acoustic Facade Type 2
<span style="color: yellow;">█</span>	Acoustic Facade Type 3

Do not scale shop-drawing dimensions or report any discrepancies. Plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater
Urbis	Telford Civil
Landscape Architect	Geotech
Wyer & Co	EI Australia
Structure	BCA
Northop	BCAlign
Building Services	Traffic
O&S Consulting	JMT Consulting
Basix + ESD	Waste
Credwell	Elephants Foot
Fire + Acoustic	Access
E-Lab	Purple Apple

**Architects**  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tzg.com.au  
 E info@tzg.com.au

**Client**  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

**Project**  
**Verona, Paddington**

**Phase**  
**SSDA**

**Job No.**  
 24026

**Drawing Title**  
**LEVEL 5 FLOOR PLAN**

**Drawing No.** A 110  
**Rev** B

**Drawn** AM, IR, CY  
**Date** 22/05/2026

**Checked** TG

**Scale** 1:200@A3  
 0 2 4 8 m @A3

**Nominated Architects**  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603



MARSHALL STREET

VERONA STREET

OXFORD STREET

20-2 ROSE TERRACE

11/497 SETBACK TO 2 VERONA STREET BOUNDARY

OXFORD STREET

**E-LAB Consulting**

Title: Acoustic Facade Types  
 Date: 2026/05/22  
 Discipline: Acoustics  
 Sketch By: Oscar Koch  
 Approved By: Artie Rattananikom

**Legend**

- Acoustic Facade Type 1
- Acoustic Facade Type 2
- Acoustic Facade Type 3

Do not scale shop-drawing dimensions or report any details, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater
Urbis	Telford Civil
Landscape Architect	Geotech
Wyer & Co	EI Australia
Structure	BCA
Northop	BCAlign
Building Services	Traffic
O&S Consulting	JMT Consulting
Basix + ESD	Waste
Credwell	Elephants Foot
Fire + Acoustic	Access
E-Lab	Purple Apple

Architects  
**TonkinZulaikhaGreer**

117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia

ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tzg.com.au  
 E info@tzg.com.au

Client  
**WT Malouf**

Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia

T 02 9331 4000  
 E -

Project  
**Verona, Paddington**

Phase  
**SSDA**

Job No.  
 24026

Drawing Title  
**LEVEL 6 FLOOR PLAN**

Drawing No.  
**A 111**

Rev  
**B**

Drawn  
**AM, IR, CY**

Date  
**22/05/2026**

Checked  
**TG**

Scale  
 0 2 4 8 m @A3  
 1:200@A3

Nominated Architects  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603



1-11 OXFORD STREET  
 25HR HOTEL

20-2 ROSE TERRACE

MARSHALL STREET

VERONA STREET

11.497  
 SETBACK TO 2 VERONA STREET BOUNDARY

**Legend**

- Acoustic Facade Type 1
- Acoustic Facade Type 2
- Acoustic Facade Type 3

Do not scale shop-drawing dimensions or report any discrepancies. Plans, specifications and the copyright therein are the property of Tonkin Zulaikha Greer Architect Pty Ltd and must not be reproduced or copied wholly or in part without written permission of Tonkin Zulaikha Greer Architects Pty Ltd.

Planner	Civil + Stormwater
Urbis	Telford Civil
Landscape Architect	Geotech
Wyer & Co	EI Australia
Structure	BCA
Northop	BCAlign
Building Services	Traffic
O&S Consulting	JMT Consulting
Basix + ESD	Waste
Credwell	Elephants Foot
Fire + Acoustic	Access
E-Lab	Purple Apple

**Architects**  
**TonkinZulaikhaGreer**  
 117 Reservoir Street  
 Surry Hills NSW 2010  
 Australia  
 ABN 46 002 722 349  
 T +61 2 9215 4900  
 W tgz.com.au  
 E info@tgz.com.au

**Client**  
**WT Malouf**  
 Suite 1.03, 2-8 Elizabeth Street  
 Paddington NSW 2021  
 Australia  
 T 02 9331 4000  
 E -

**Project**  
**Verona, Paddington**

**Phase**  
**SSDA**

**Job No.**  
 24026

**Drawing Title**  
**LEVEL 7 ROOFTOP FLOOR PLAN**

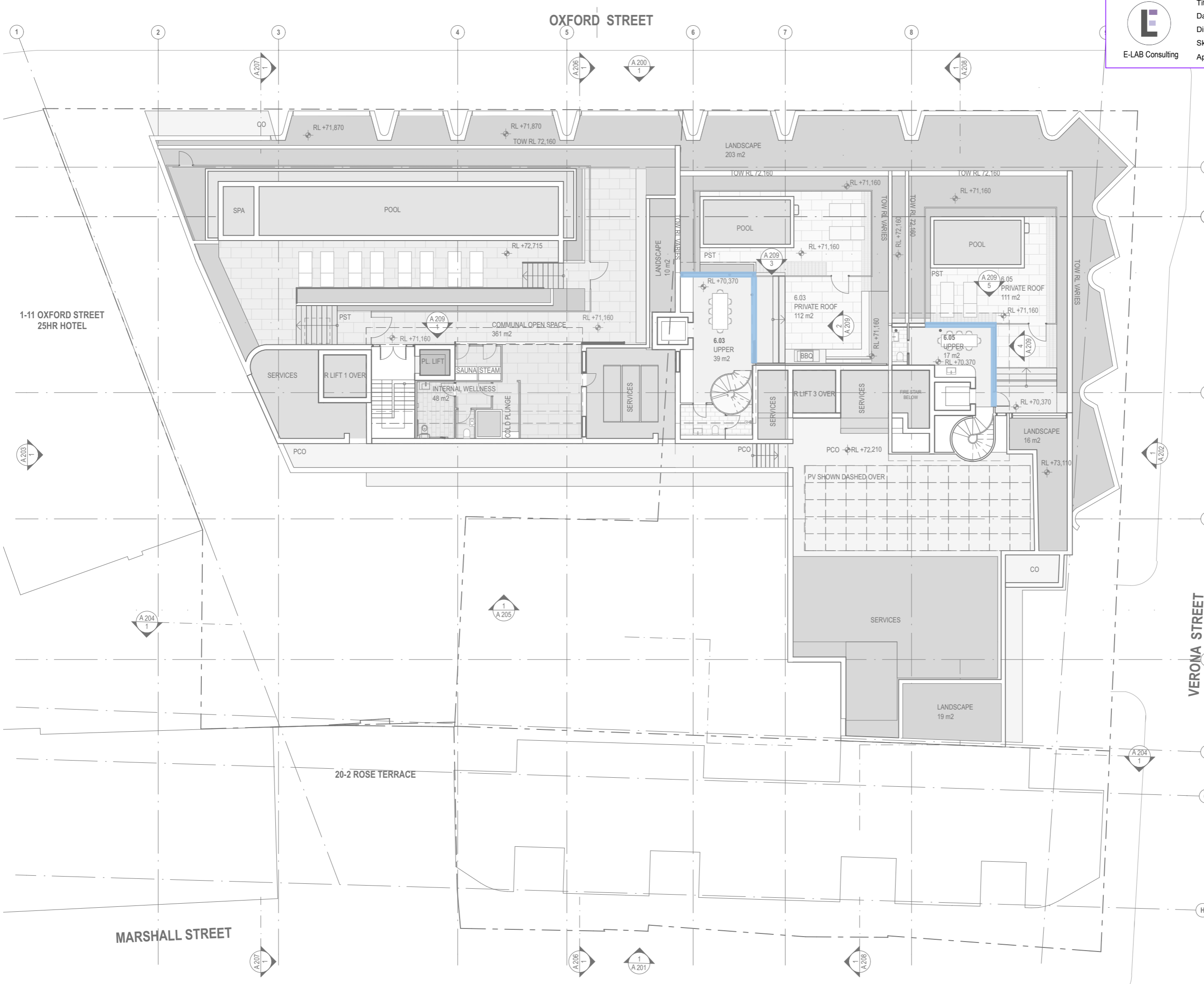
**Drawing No.** A 112  
**Rev** B

**Drawn** AM, IR, CY  
**Date** 22/05/2026

**Checked** TG

**Scale** 1:200@A3  
 0 2 4 8 m @A3

**Nominated Architects**  
 Peter Tonkin NSW Registration 4147  
 Tim Greer NSW Registration 5603



1-11 OXFORD STREET  
25HR HOTEL

20-2 ROSE TERRACE

MARSHALL STREET

OXFORD STREET

VERONA STREET

## Appendix D      **Construction Noise Contour Maps**

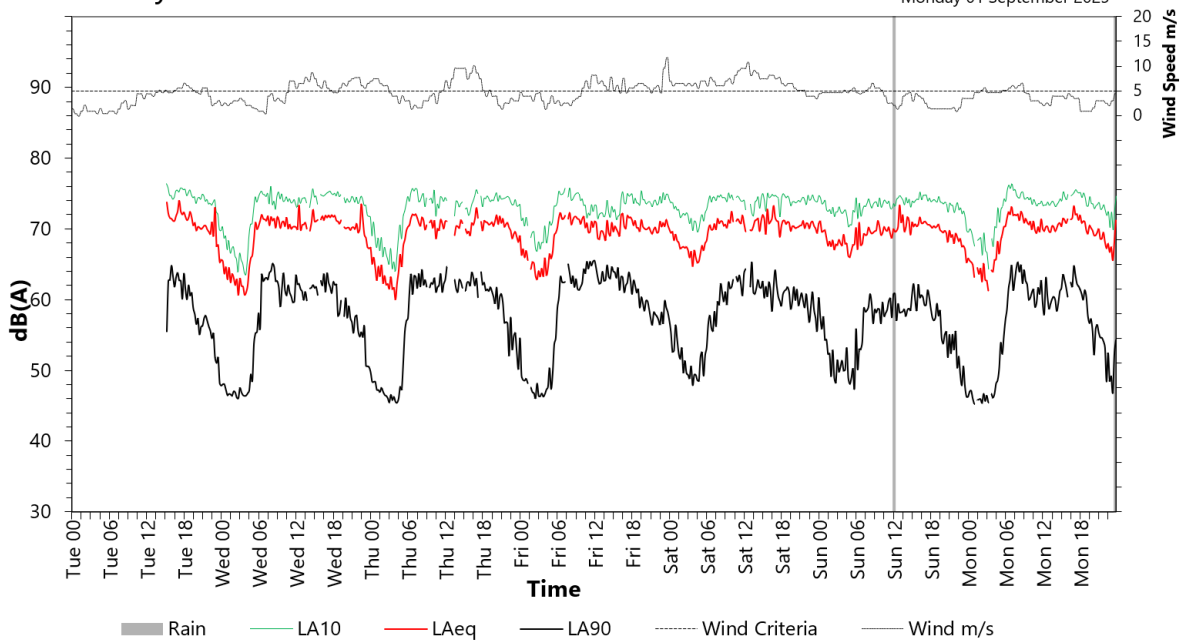


# Appendix E Noise Monitoring Data

Figure 5: Long-term noise monitoring data graph (LT1)

**P02598 - Oxford Street, Paddington**  
**LT1 - Sentry 3**

Tuesday 26 August 2025  
 to  
 Monday 01 September 2025



**P02598 - Oxford Street, Paddington**  
**Sentry 3**

Tuesday 02 September 2025  
 to  
 Monday 08 September 2025

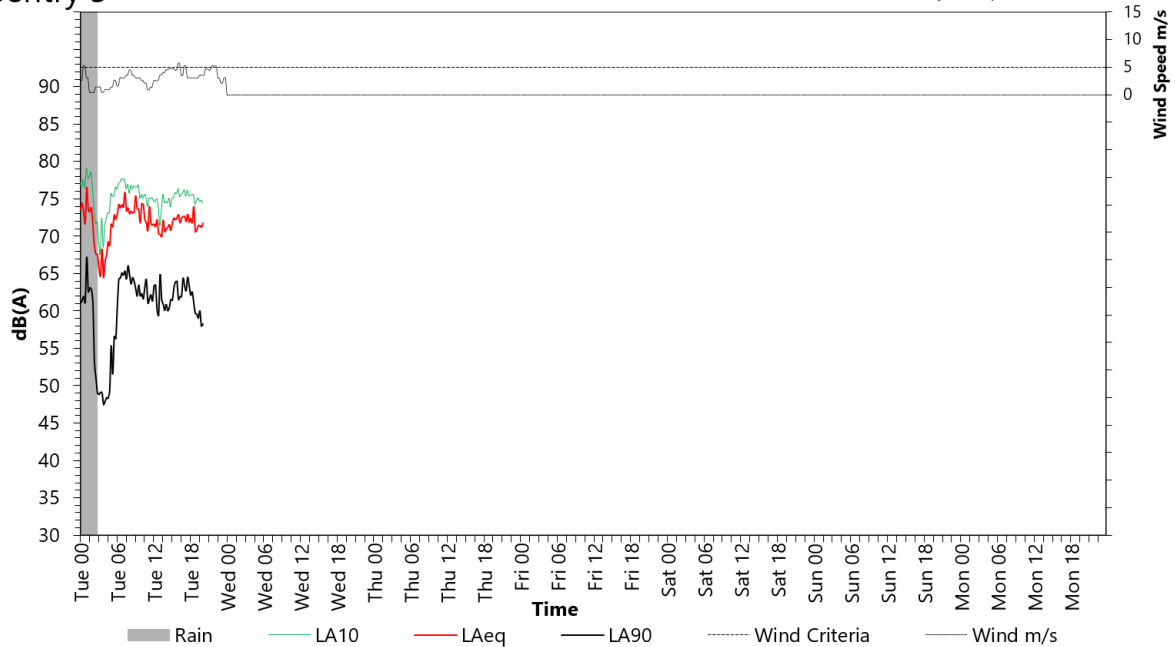
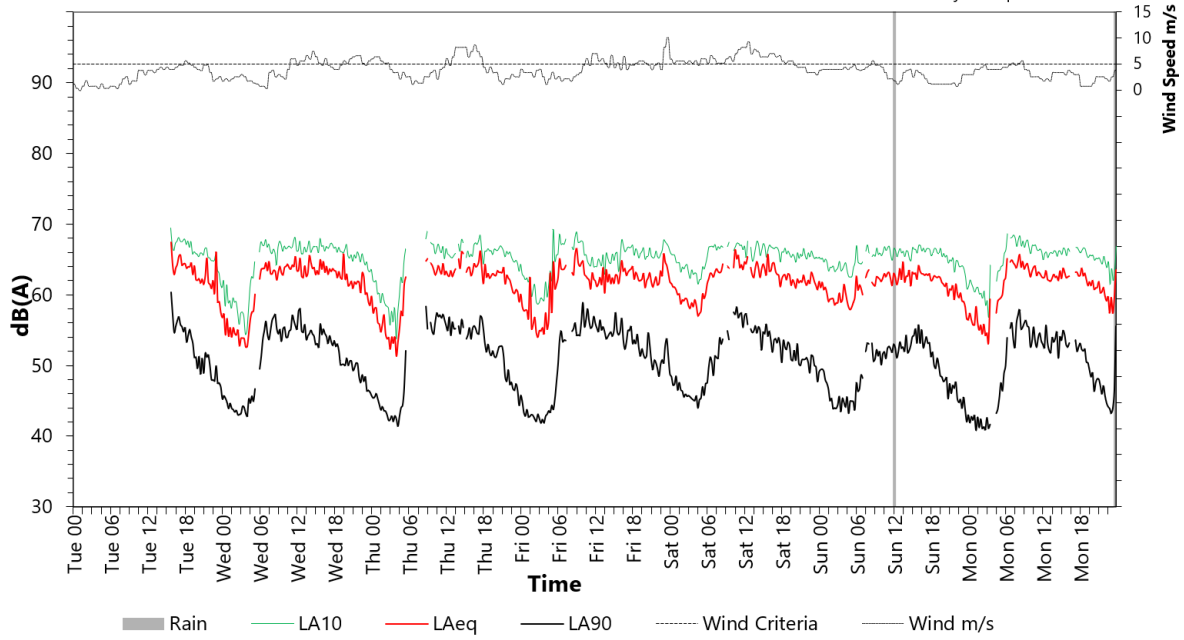


Figure 6: Long-term noise monitoring data graph (LT2)

**P02598 - Oxford Street, Paddington**  
**LT2 - Sentry 19**

Tuesday 26 August 2025  
 to  
 Monday 01 September 2025



**P02598 - Oxford Street, Paddington**  
**Sentry 19**

Tuesday 02 September 2025  
 to  
 Monday 08 September 2025

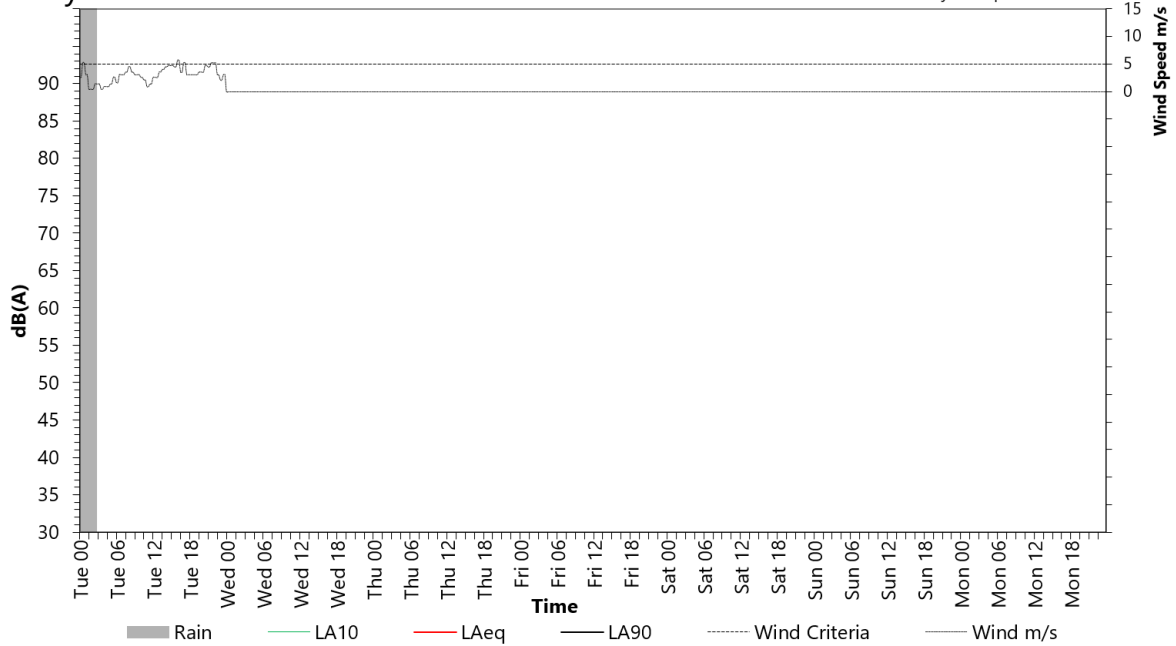
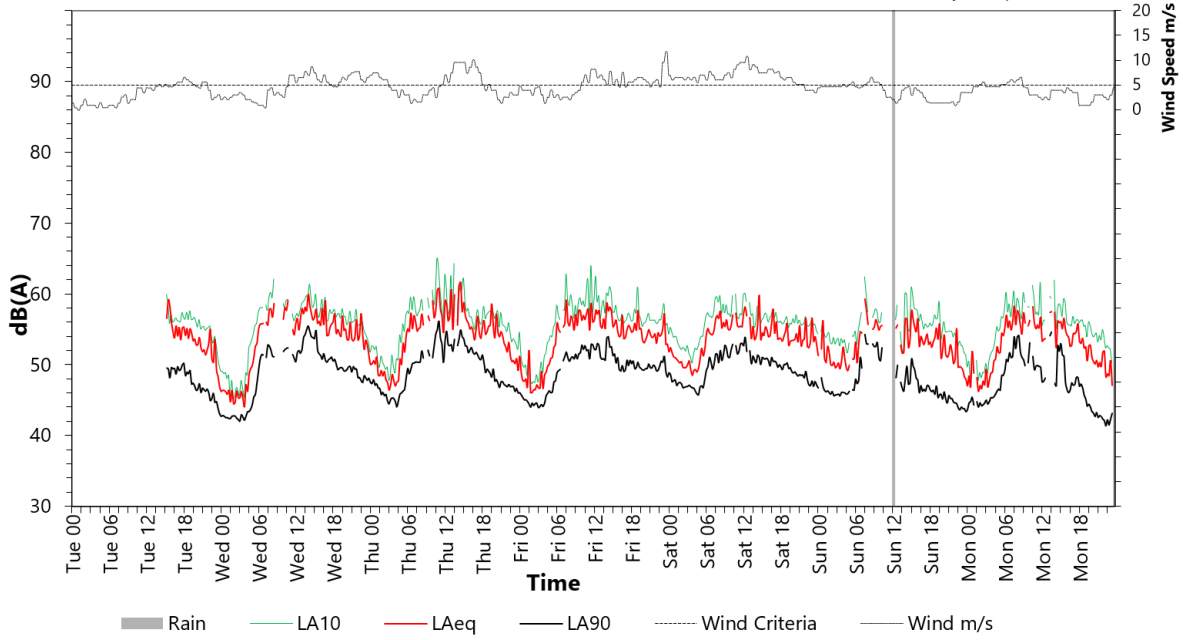


Figure 7: Long-term noise monitoring data graph (LT3)

**P02598 - Oxford Street, Paddington**  
Sentry 15

Tuesday 26 August 2025  
to  
Monday 01 September 2025



**P02598 - Oxford Street, Paddington**  
Sentry 15

Tuesday 02 September 2025  
to  
Monday 08 September 2025

