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The Mercantile Hotel

25-27 George Street, The Rocks

SSDA Noise Assessment

Report Number 610.17382-R02

7 February 2018

HBMS NSW Pty Ltd

C/-Welsh + Major Architects

Level 4, 69 Reservoir Street

SURRY HILLS NSW 2010

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The Mercantile Hotel

25-27 George Street, The Rocks

SSDA Noise Assessment

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Information reported herein is based on the interpretation of data collected,
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DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.17382-R02-v3.0	7 February 2018	Matthew Bryce	Jim Antonopoulos	Matthew Bryce
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1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has undertaken a noise assessment to support the State Significant Development Application (SSDA) for the proposed refurbishment of The Mercantile Hotel, 25-27 George Street, The Rocks ("the venue").

The assessment addresses the Secretary's Environmental Assessment Requirements (SEARs), issued on 1 September 2017 by New South Wales (NSW) Planning and Environment (SSD 8665), and involved the following:

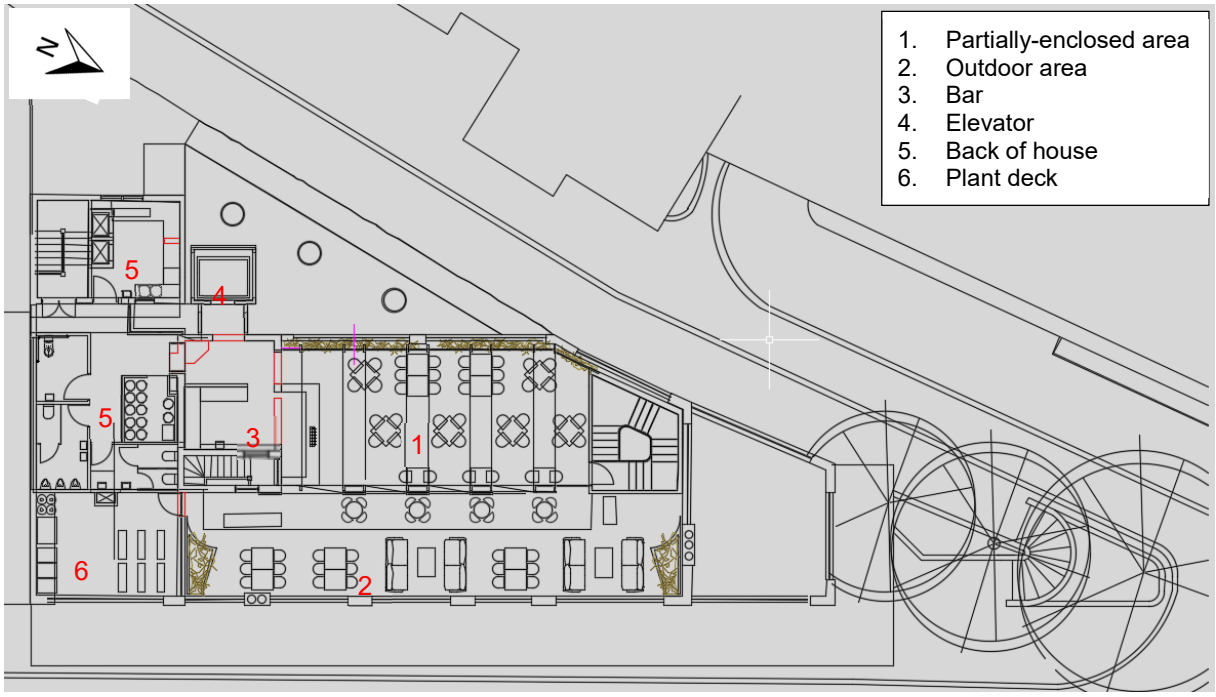
- Determining noise limits for the venue based on policies and guidelines relating to noise in place in NSW.
- Consideration of noise emissions from external mechanical plant (located on the venue rooftop);
- Consideration of noise emissions from the proposed rooftop bar area and its patrons;

2 PROJECT DESCRIPTION AND SURROUNDS

The venue will undergo a refurbishment to all areas and include a new rooftop bar area. The venue currently offers hotel accommodation on Levels 1 and 2, which will continue after the refurbishment. The level of refurbishment to the accommodation areas of the venue will be relatively minor.

The proposed layout of the rooftop area is shown in **Figure 1**. 3D representations of the proposed rooftop design are shown in **Appendix A**.

Figure 1 Roopftop Area – Proposed Layout



It can be seen that the main rooftop area will include a partially-enclosed area with cantilevered roof and a fully open area. The "open side" of the semi-enclosed area faces to the east. Folding doors may be used to separate the two areas, creating a full enclosure, however it is understood that the doors will usually be open.

It is understood that the venue will have capacity for 100 patrons in the outdoor area and 70 patrons in the partially-enclosed area but no more than 150 patrons in total overall. Patrons will be mostly seated. It is also understood that the venue will provide low level “ambience” music via speakers located within the partial-enclosure.

The partially-enclosed area will be enclosed on the north, west and south sides and the roof, and have openable concertina-type doors facing east. The preferred material for the partial enclosure has yet to be finalised, however it is likely that transparent material will be used in some areas. A range of materials will be available for selection, however a minimum surface mass of 14 kg/m^2 will be required to prevent noise breakout. Suitable materials will include glass (no less than 6 mm thick), polycarbonate (eg “Perspex”, no less than 12 mm thick).

Mechanical plant for refrigeration and airconditioning will be located within a separate area at the southern end of the rooftop.

The location of the venue and its surrounds are shown in **Figure 2**.

The nearest noise sensitive receptors to the venue will be multi-storey apartments at:

- 44 Cumberland Street (Receptor 1 – approximately 7 m from the west edge of the rooftop); and
- 8 Hickson Road (Receptor 2 – approximately 30 m from the northeast edge of the rooftop).

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GDA 1994 MGA Zone 56

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SLR

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Site Location & Surrounds

FIGURE 2

3 EXISTING NOISE ENVIRONMENT

SLR undertook noise monitoring to establish the ambient environment in the absence of noise emissions from the venue, as this will determine the venue's noise limits.

The monitoring was conducted between Friday 2 June 2017 and Thursday 8 June 2017 on the rooftop of the venue. That location was adjacent to the apartment building at 44 Cumberland Street, The Rocks, which will be the nearest sensitive receptor to venue's rooftop area and also representative of ambient noise at other receptors near to the venue.

The monitoring was undertaken using a SVAN Type 957 Sound Level Meter (Serial Number 27522), set up as an environmental noise logger programmed to record A-weighted fast response statistical noise levels in 15 minute intervals. The calibration of the instrumentation was checked before and after the monitoring period and was found to be within an acceptable margin of ±1 dBA of the reference signal.

All items of acoustic instrumentation were designed to comply with Australian Standard (AS) IEC 61672.1 2004 *Electroacoustics – Sound Level Meters* and AS IEC 60942 2004 *Electroacoustics – Sound calibrators*, and carried current NATA or manufacturer calibration certificates.

SLR obtained weather data from the Bureau of Meteorology (BOM) automated weather station located at Observatory Hill (Station ID: 066062, Lat: -33.86, Lon: 151.21) for the monitoring period.

Noise results obtained during periods of weather unsatisfactory for noise monitoring, ie wind speeds exceeding 5 m/s and/or rainfall exceeding 0.5 mm, have been shaded in the noise logger results graphs in **Appendix B** and were excluded from the data analysis.

The ambient noise environment at the Project site was dominated by road and rail traffic crossing the Sydney Harbour Bridge.

The noise survey results are summarised in **Table 1**.

Table 1 Summary of Ambient Background Noise Monitoring Results

Period	Rating Background Level (RBL), dBA $L_{A90(15minute)}$	Ambient Noise Level, dBA $L_{Aeq(period)}$
INP Day (7:00 am – 6:00 pm)	57	61
INP Evening (6:00 pm – 10:00 pm)	57	61
INP Night-time (10:00 pm – 7:00 am)	50	58

The noise survey results were also analysed to obtain noise levels that form the basis for assessment of the rooftop bar emissions. These have been in are summarised in **Table 2**.

Table 2 Ambient Background Noise Levels Corresponding to Liquor and Gaming NSW Assessment Periods

Time Period	Measured Background Noise Level, dBA L_{A90} Octave Band Centre Frequency (Hz)									Overall Level, dBA L_{A90}
	31.5	63	125	250	500	1000	2000	4000	8000	
7:00 am to Midnight	24	35	43	46	50	52	48	40	28	56
Midnight to 7:00 am	14	26	34	41	44	46	43	36	26	50

4 NOISE CRITERIA

SEARs SSD 8665 for the project stipulates consideration of the following policies, instruments and guidelines in relation to noise:

- *State Environmental Planning Policy (Infrastructure (2007)*;
- *Development near Rail Corridors and Busy Roads – Interim Guideline* (2008); and
- City of Sydney *Development Control Plan 2012*;

Specifically, Section 10 of the SEARs states:

> *Provide a Noise and Vibration Assessment, including consideration of the proposed plant and mechanical ventilation, and operation of the rooftop bar in accordance with the relevant EPA guidelines. This assessment must detail construction noise impacts and consider any potential operational noise impacts on nearby noise sensitive receivers and outline proposed noise mitigation and monitoring issues.*
>
> *Relevant Policies and Guidelines:*
>
> - NSW Industrial Noise Policy 2000 *(EPA)*
> - NSW Industrial Noise Policy – application notes 2013 *(EPA)*
> - Interim Construction Noise Guideline 2009 *(DECC)*
> - Assessing Vibration: A Technical Guideline 2006 *(DECC)*

The relevant criteria from those policies and guidelines are considered in **Table 3**.

Table 3 Noise Policies and Guidelines

Policy/Guideline	Applicable	Comment
State Environmental Planning Policy (Infrastructure (2007)	No	The Infrastructure SEPP applies when new residential developments are located within close proximity to major road and rail infrastructure.
Development near Rail Corridors and Busy Roads – Interim Guideline (2008)	No	This Guideline relies upon the Infrastructure SEPP criteria and applies when new sensitive receptors are developed near existing road and rail infrastructure.
City of Sydney Development Control Plan 2012:		
Acoustic Amenity (within development)	No	Applies to new or substantially modified developments. The accommodation component of the Hotel refurbishment is undergoing only superficial refurbishment. Consequently, the DCP criteria relating to acoustic amenity within the Hotel will not apply.
Rooftop Bar and Patron Noise	Yes	No specific criteria nominated in the DCP, however Liquor and Gaming NSW criteria (now withdrawn) are commonly used in NSW to assess noise from entertainment venues (refer to **Section 4.1**).
NSW Industrial Noise Policy and application notes	Yes	Mechanical plant noise emissions must achieve applicable noise limits (refer to **Section 4.2**). Note that the Industrial Noise Policy (2000) has snice been superseded by the Noise Policy for Industry (2017). However, as the SEARs for this development predated this change, it is considered appropriate to retain the use of the Industrial Noise Policy.
Interim Construction Noise Guideline 2009	Yes	Construction noise will be considered as part of a Construction Noise and Management Plan (CNVMP) to be prepared when details of the construction activities and plant/equipment to be used become known.
Assessing Vibration: A Technical Guideline 2006	Yes	Construction vibration will be considered as part of a Construction Noise and Management Plan (CNVMP) to be prepared when details of the construction activities and plant/equipment to be used become known.

4.1 Rooftop Bar Noise Emissions

The criteria are based on standard conditions originally developed by Liquor and Gaming NSW, but have since been withdrawn. Nonetheless, it is common and appropriate to apply the criteria to noise emissions from licensed premises in NSW, and in particular within the City of Sydney catchment.

The following criteria have been used to assess noise from the rooftop bar area:

> *The LA10* noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5 Hz – 8k Hz inclusive) by more than 5 dB between 07:00 am and 12:00 midnight at the boundary of any affected residence.*
>
> *The LA10* noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5 Hz – 8k Hz inclusive) between 12:00 midnight and 07:00 am at the boundary of any affected residence.*
>
> *Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 07:00 am.*
>
> ** For the purposes of this condition, the LA10 can be taken as the average maximum deflection of the noise emission from the licensed premises.*

The criteria are applicable for all noise emissions from the venue, ie music and patrons, at all nearby noise sensitive receptors.

Based on the criteria and the existing ambient noise levels in **Table 2**, the project specific noise limits have been established for each assessment period in **Table 4**.

Table 4 Project Specific Noise Limits – Venue Rooftop Noise

Time Period	Noise Limits, dBA L_{A10} Octave Band Centre Frequency (Hz)								
	31.5	63	125	250	500	1000	2000	4000	8000
7:00 am to Midnight	29	40	48	51	55	57	53	45	33
Midnight to 7:00 am	14	26	34	41	44	46	43	36	26

4.2 Industrial Noise Policy

Noise from mechanical plant must comply with noise limit determined in accordance with the NSW *Industrial Noise Policy 2000* (INP).

The INP sets out two noise assessment criteria:

- Intrusive criterion: the potential for disturbance; and
- Amenity criterion: a second criterion to preserve noise amenity of the land use and protect against noise impacts such as community annoyance and speech interference.

The lower of the intrusive and amenity criteria is set as the project-specific noise level criterion.

4.2.1 Intrusive Criterion

To protect against intrusive noise, the INP states that the noise level of the source in question, measured over a period of 15 minutes, must not exceed the ambient background noise level (in terms of the RBL), for the day, evening and night-time periods at the applicable sensitive receptors, ie

Noise source (dBA $L_{Aeq(15minute)}$) ≤ RBL (dBA L_{A90}) + 5 dBA

Referencing the RBLs determined from the ambient noise measurements in **Table 1**, the intrusive noise criterion for the critical night-time period is detailed in **Table 5**. Noise that is compliant at that time will also be compliant at other times when limits will be higher.

Table 5 Intrusive Noise Criterion

INP Assessment Period	RBL, dBA	Intrusive Noise Criterion, dBA
Night (10:00 pm – 7:00 am)	50	55

4.2.2 Amenity Criterion

The amenity criterion is based on the land use surrounding the site. The INP recommends the application of feasible and reasonable noise management and control measures to achieve the 'acceptable' amenity noise criterion. Where this cannot be achieved the 'maximum' amenity noise criteria is referenced.

In the context of the INP, the surround land uses would be considered "Urban". **Table 6** provides the amenity noise criterion for the sensitive land uses surrounding the site. As the area contains little industrial noise, the level of existing industrial noise will be sufficiently low so as to not require any modifications to the acceptable levels in **Table 6** above.

Table 6 Amenity Noise Criterion for Sensitive Land Uses

Type of Receptor	Indicative Noise Amenity Area	INP Assessment Period	Recommended Noise Level, dBA L_{Aeq}	
			Acceptable	Maximum
Residence	Urban	Night	45	50

4.2.3 Modifying Factors

The INP requires modifying factors to be applied to the predicted noise levels if the source noise, at the receptor, contains specific low frequency, tonal, impulsive or intermittent character.

Noise from residential airconditioners and carpark exhaust systems does not usually exhibit such characteristics and therefore, no adjustments to account for annoyance will be necessary.

5 NOISE ASSESSMENT

5.1 Rooftop Bar Noise Emissions

5.1.1 Calculation of Pre-midnight Maximum Allowable Rooftop Noise Levels

A 3D SoundPLAN noise model of the proposed rooftop area design and it surrounds was established to predict the maximum allowable noise emissions from the rooftop area that will result in compliance with the Liquor and Gaming NSW noise limits for the at the nearby sensitive receptors.

The maximum allowable sound power levels are shown in **Table 7**. Patron noise from the rooftop was modelled as "area" sources. A source height of 1.5 m was applied, ie most patrons have been assumed to be seated.

Table 7 Maximum Allowable Noise Levels from the Venue – 10:00 am - Midnight

Maximum Venue L_{A10} Noise Levels, dBA L_{Aw} Octave Band Centre Frequency (Hz)									Overall Level L_{wA}, dBA L_{A10}
31.5	63	125	250	500	1000	2000	4000	8000	
61	74	84	89	93	95	89	81	71	99

5.1.2 Discussion of Pre-midnight Rooftop Noise Levels

The maximum allowable values in **Table 7** will allow the venue to operate with up to 100 people in the outdoor terrace area and up to 70 people in the partially-enclosed area with the east-facing doors opened or closed.

That statement is made based on sound power and measurement data relating to licensed venues similar in character to the proposed rooftop bar referenced by member firms of the Association of Australasian Acoustical Consultants.

Music may be provided to the partially-enclosed area only, however the sound system must be carefully designed and installed to not exceed the levels shown in **Table 8**.

Table 8 Maximum Noise Levels for Sound System – three speakers

Noise Level Descriptor	Maximum Venue Noise Levels, dBA L_{A10} Octave Band Centre Frequency (Hz)									Overall Level, dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
SWL[1] L_{A10}, dBA L_{Aw}	57	68	76	77	80	82	78	70	58	86
SPL[1] at 1 m, dBA L_{A10}	46	57	65	66	69	71	67	59	47	75

1. The difference between the sound power level (SWL) and the sound pressure level (SPL) at 1 m can vary depending on loudspeaker location / room arrangement. The above should be taken as indicative. Final setting of the SPL should be confirmed by an acoustical consultant.

The values in **Table 8** apply to a situation with three speakers within the partially enclosed areas, however the maximum levels can be amended to suit the number of speakers included in the preferred sound system design. The adjustment values shown in **Table 9** will apply, ie fewer speakers may be played at higher levels while more speakers must be played at lower levels.

Table 9 Octave Band Spectral Adjustment for Number of Speakers

Number of Speakers in Sound System	Adjustment Added to Maximum Noise Level, dBA Octave Band Centre Frequency (Hz)								
	31.5	63	125	250	500	1000	2000	4000	8000
1	+5	+5	+5	+5	+5	+5	+5	+5	+5
2	+2	+2	+2	+2	+2	+2	+2	+2	+2
3[1]	0	0	0	0	0	0	0	0	0
4	-1	-1	-1	-1	-1	-1	-1	-1	-1
5	-2	-2	-2	-2	-2	-2	-2	-2	-2
6	-3	-3	-3	-3	-3	-3	-3	-3	-3

1. Assessment was based on the SLR assumption of three speakers within the partially enclosed area.

5.1.3 Post-midnight Period

Further noise modelling was undertaken to determine the level of compliance, or otherwise, with the noise limits based on various configurations of the rooftop areas.

The rooftop venue may operate after midnight, ie the rooftop noise levels are predicted to comply with the 12:00 am – 10:00 am noise limits, however the following restrictions will apply:

- The east-facing doors must be closed;
- The patron numbers must not exceed 70; and
- No music is allowed.

5.2 Mechanical Plant Noise Emissions

At this stage, details of the rooftop heat-rejection mechanical plant are not available, as this will take place during the detailed design stage of the project.

The location of the plant will be in the southern end of the rooftop area which features 1.2 m high masonry balustrading to all sides. The separation distance to the Receptors 1 and 2 will be approximately 20 m and 45 m respectively.

The assessment of road and rail traffic noise is shown in **Table 10**.

Table 10 Mechanical Plant Noise Assessment

Component	Receptor 1	Receptor 2
Noise limit, dBA L_{Aeq}	50	50
Screening by structures	-15	-10
Propagation loss due to distance, dB	-34	-41
Total sound power level (all items), dBA L_w	99	101

Therefore, the maximum allowable sound power level for all the heat rejection plant combined will be of the order of 99 dBA (controlled by Receptor 1).

Based on SLR's experience in assessing noise emissions from similar plant, it is expected that plant capable of meeting the combined maximum sound power level would be readily available. This is to be confirmed during the detailed design phase when information regarding plant selection, sound output, location, and any intervening screening objects are finalised.

Where there is difficulty complying with the maximum SWL, additional noise controls may be required, including the provision of acoustic enclosure, acoustic louvers or acoustic screening. Care must be taken during the detail design of screening to ensure ventilation requirements are not compromised and the noise control targets the dominant noise frequencies.

6 CONCLUSION

It is proposed to refurbish The Mercantile Hotel at 25-27 George Street, the Rocks, and include a new bar area on the rooftop.

As required by SEARs SSD 8665 for the development, this assessment addresses noise at nearby receptors from the:

- Rooftop bar; and
- Rooftop mechanical plant.

The assessment involved establishing project specific noise criteria in accordance with the City of Sydney Council *Development Control Plan*, the NSW *Industrial Noise Policy*, and the Liquor and Gaming NSW standard conditions (now withdrawn but commonly used).

A noise survey of the existing ambient environment was undertaken to assist with establishing project noise limits.

The rooftop bar may accommodate up to 100 patrons in an outdoor terrace area and up to 70 patrons (but no more than 150 patrons in total).

The rooftop bar will be enclosed on the north, west and south sides and the roof, and have openable concertina-type doors facing east. **Figure 1** and **Appendix A** show the layout plan view and proposed design of the rooftop area respectively. The nearest sensitive receptors to the rooftop area will be those shown in **Figure 2**.

Noise associated with the proposed rooftop bar design has been considered with regard to standard conditions usually applied to licensed entertainment venues in NSW.

Noise modelling was used to determine the maximum allowable noise levels from the rooftop area, including the maximum noise contributions from the venue sound system. Based on those levels, the following operational conditions will apply to the rooftop area:

- 7:00 am – 12:00 am midnight:
  - No more than 150 patrons in the rooftop bar area in total;
  - no more than 100 patrons in the outdoor terrace area at any time;
  - no more than 70 patrons in the partially-enclosed area at any time;
  - speakers must be located within the partially enclosed area only;
  - music levels must not exceed the values shown in **Table 8** and **Table 9**.
- 12:00 am midnight – 7:00 am:
  - The east-facing doors must be closed;
  - No patrons in the outdoor terrace area;
  - The patron numbers within the enclosed area must not exceed 70; and
  - No music is allowed.

Acoustic calculations indicate that a maximum combined sound emission (SWL) of 99 dBA L_W for all external mechanical plant located on the rooftop would result in compliance with the INP noise limit at all times. **Section 5.2** of this report provides further details.

Details relating to the construction activities, methods and plant/equipment items are not known at this stage, making it impractical to adequately assess construction noise and vibration emissions. It would be expected that the provision of a Construction Noise and Vibration Management Plan (CNVMP) would form part of the Conditions of Consent for the development.

3D REPRESENTATIONS OF PROPOSED ROOFTOP VENUE DESIGN

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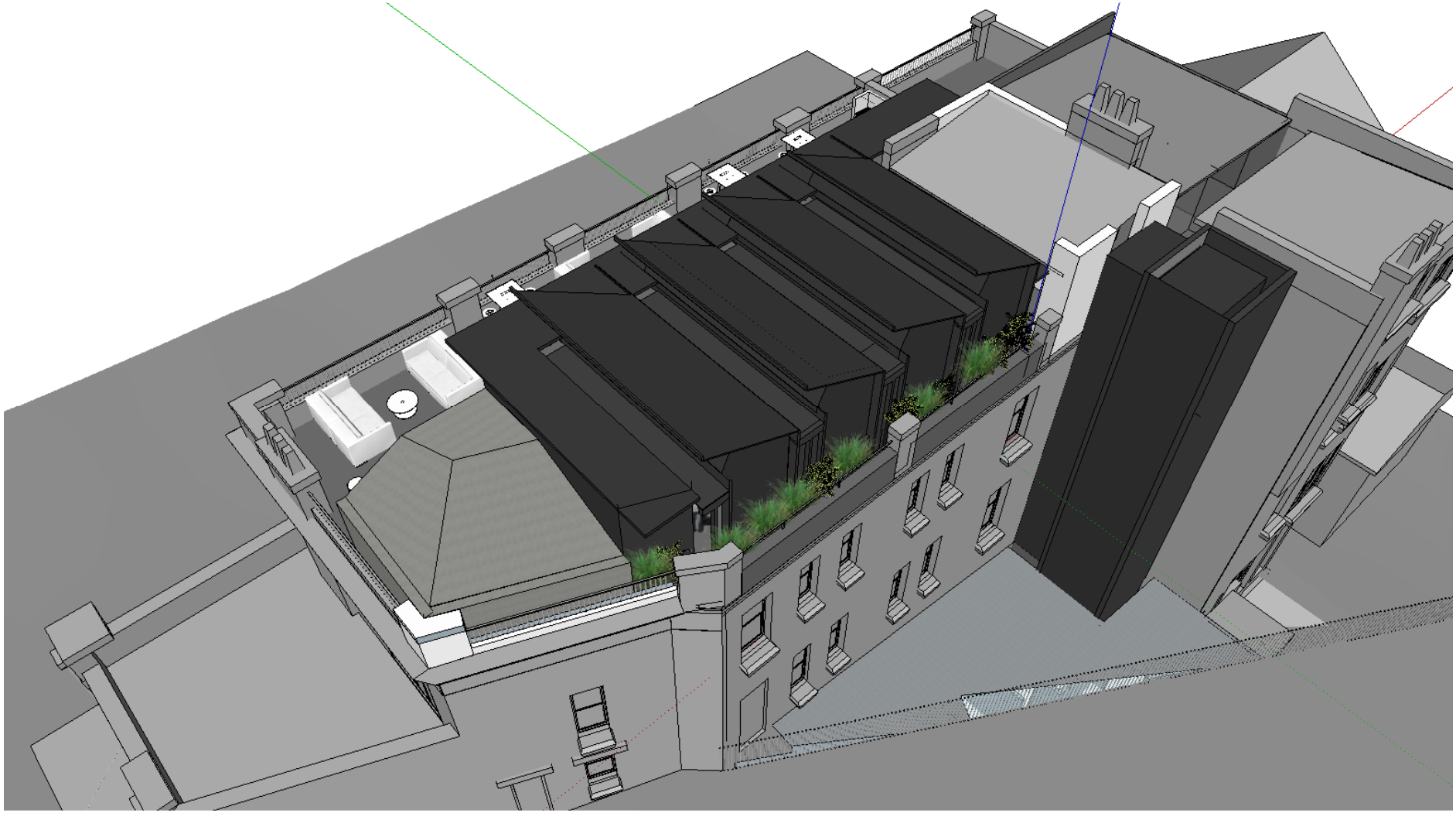
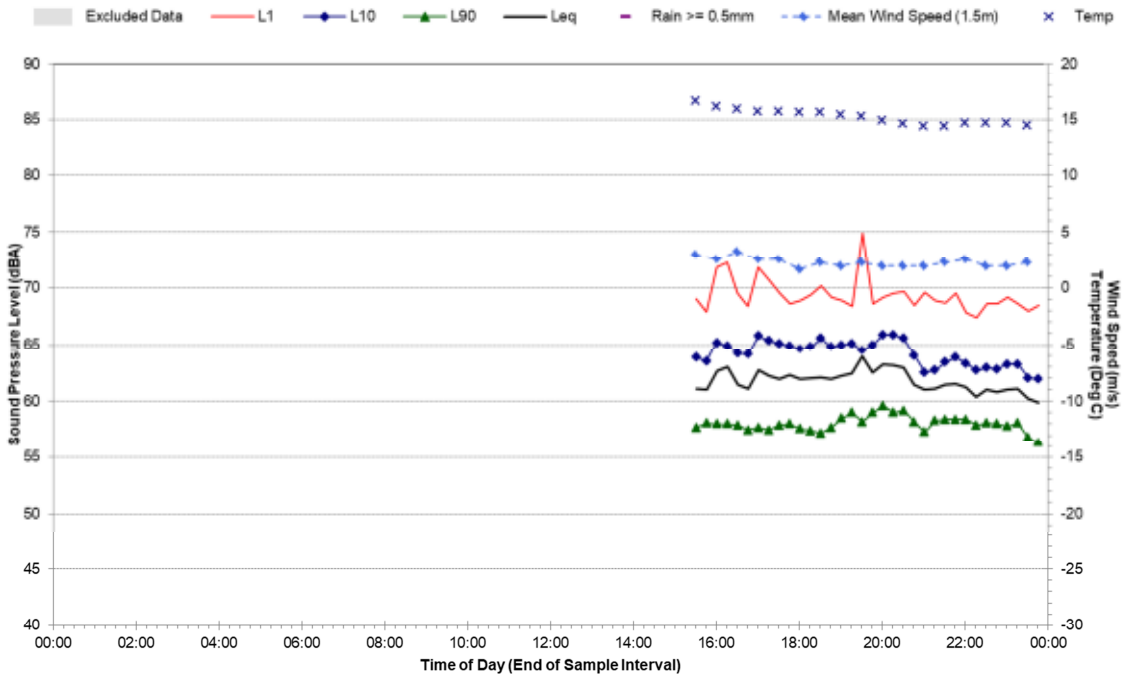


AMBIENT NOISE MONITORING RESULTS

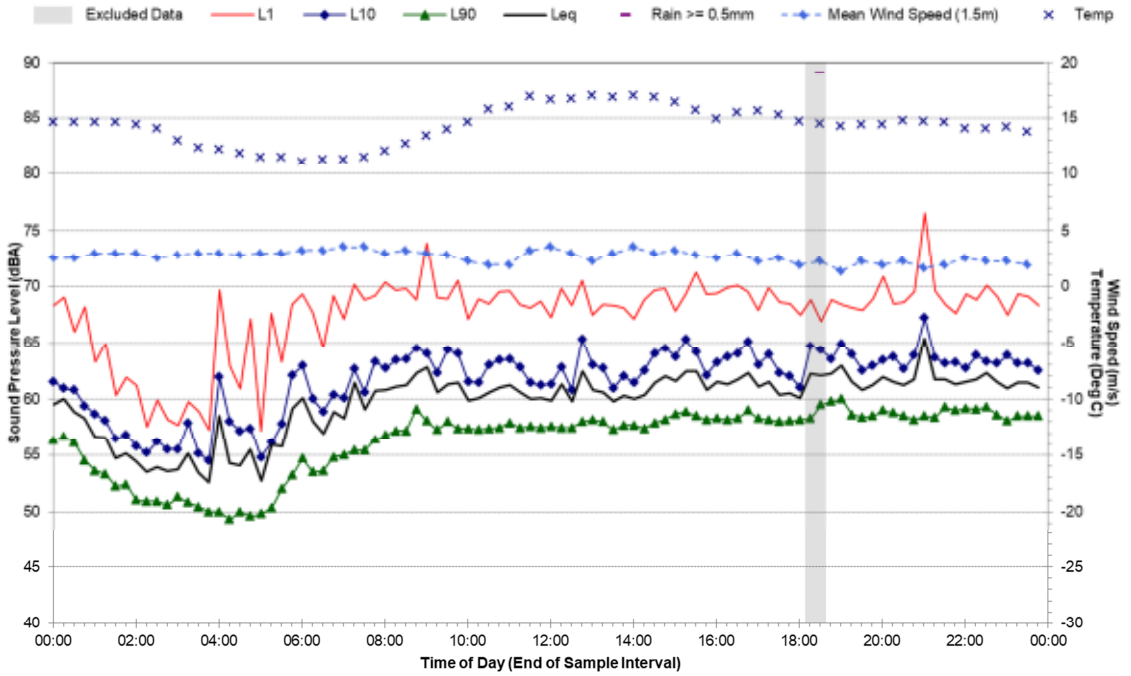
Statistical Ambient Noise Levels

Hotel Rooftop - Friday, 2 June 2017



Statistical Ambient Noise Levels

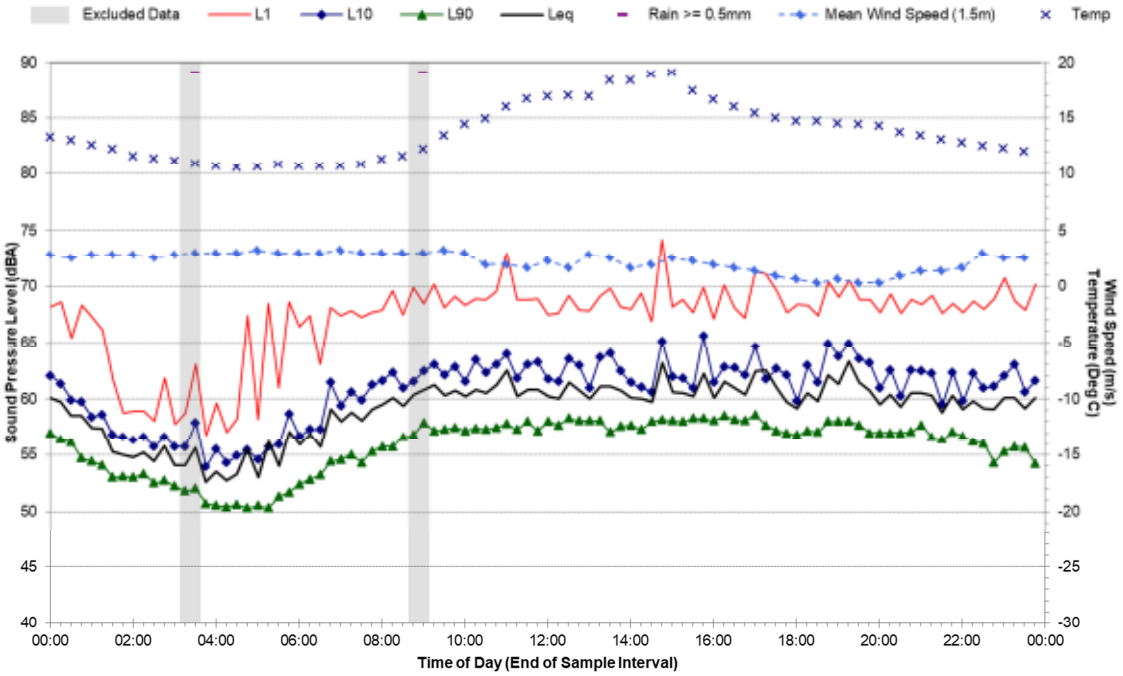
Hotel Rooftop - Saturday, 3 June 2017



AMBIENT NOISE MONITORING RESULTS

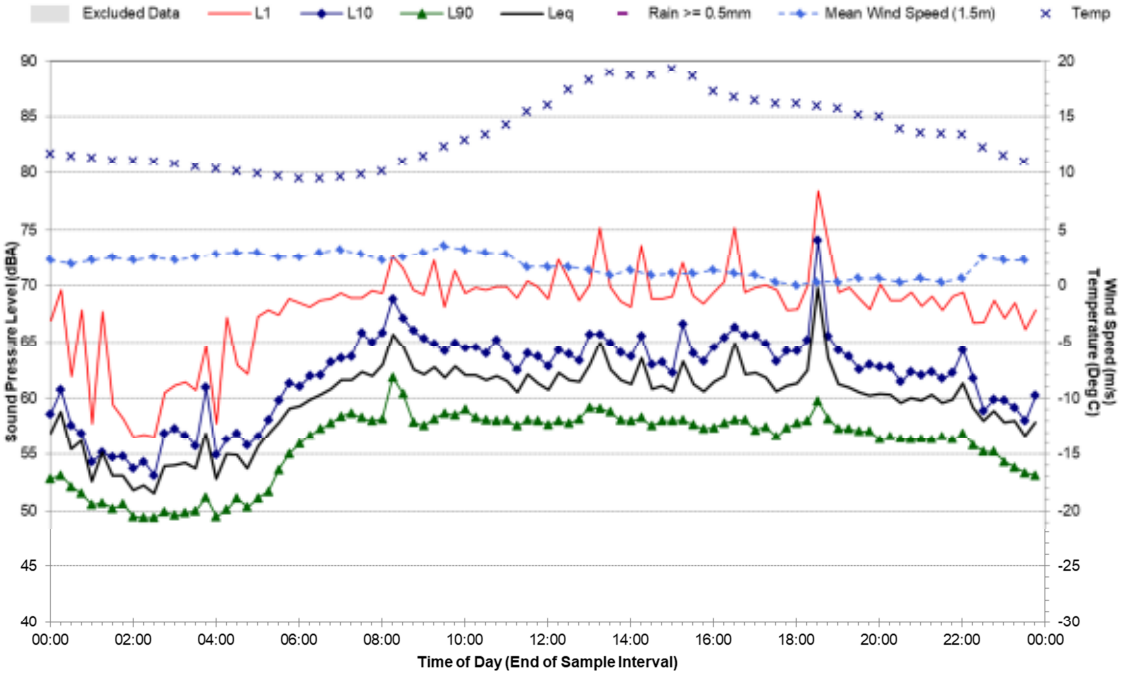
Statistical Ambient Noise Levels

Hotel Rooftop - Sunday, 4 June 2017



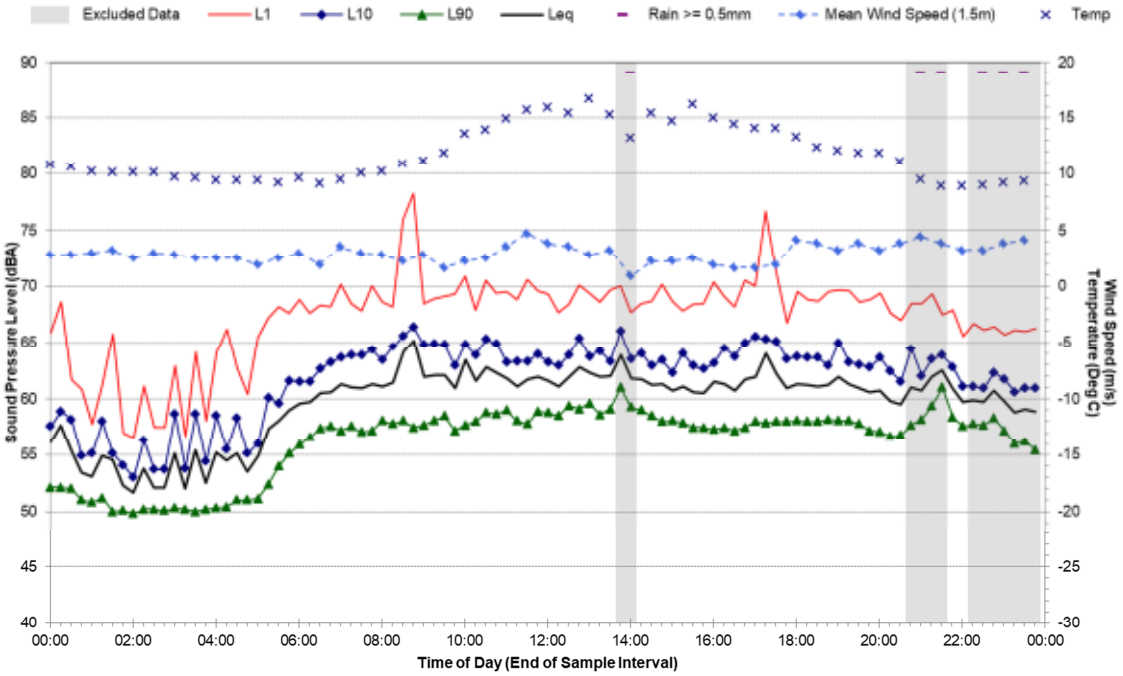
Statistical Ambient Noise Levels

Hotel Rooftop - Monday, 5 June 2017



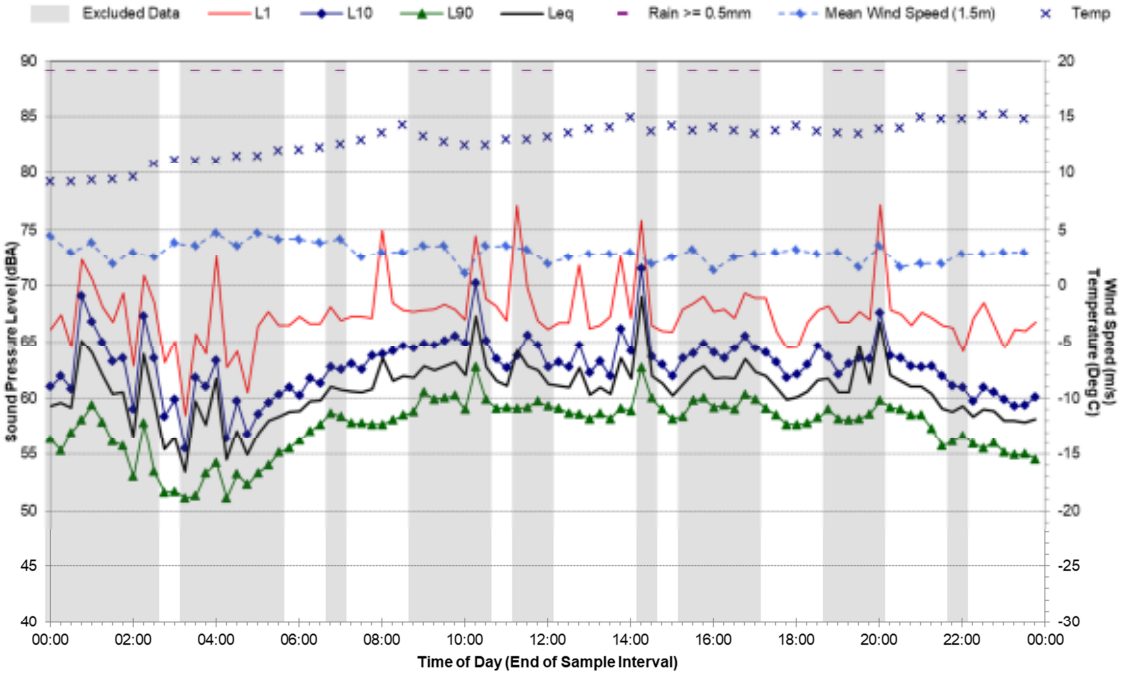
Statistical Ambient Noise Levels

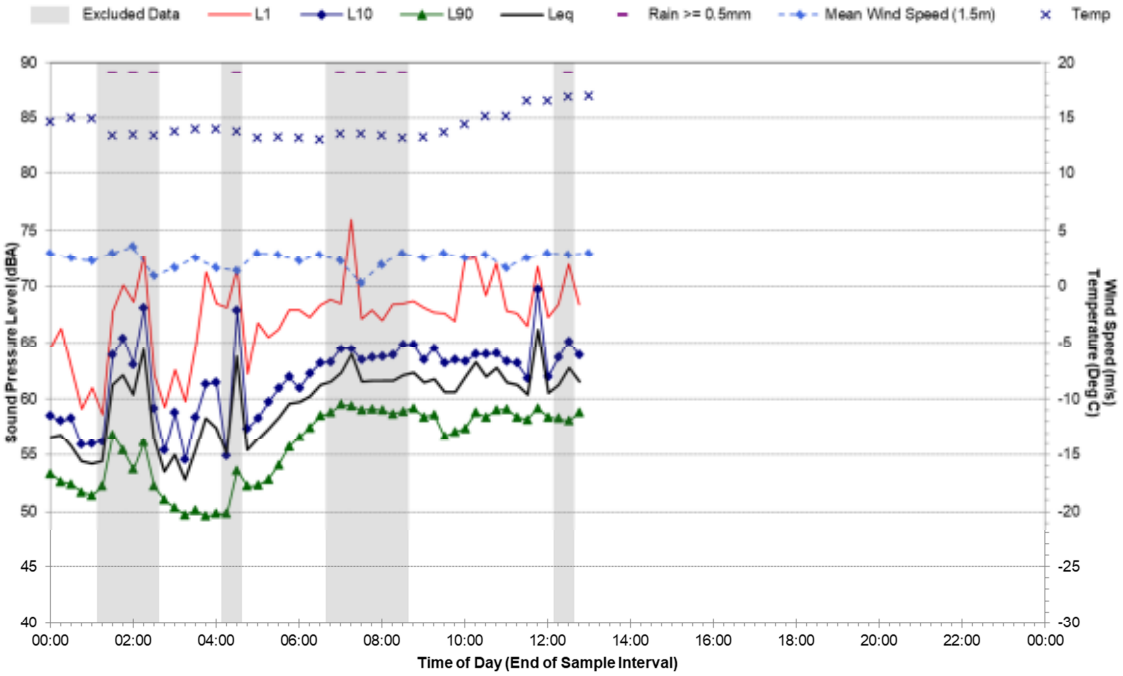
Hotel Rooftop - Tuesday, 6 June 2017



Statistical Ambient Noise Levels

Hotel Rooftop - Wednesday, 7 June 2017



Statistical Ambient Noise Levels

Hotel Rooftop - Thursday, 8 June 2017