Manly Wharf – Balustrade, Pizza Oven and Kids Play Area – DA Acoustic Assessment

DA Acoustic Assessment

Artemus Group

Report Reference: 240573 – Manly Wharf – Balustrade, Pizza Oven and Kids Play Area – DA Acoustic Assessment – DA Acoustic Assessment – R3
Date: 9 December 2024

Revision: R3

Project Number: 240573

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DOCUMENT CONTROL

Project Name:	Manly Wharf – Balustrade, Pizza Oven and Kids Play Area – DA Acoustic Assessment
Project Number:	240573
Report Reference:	240573 – Manly Wharf – Balustrade, Pizza Oven and Kids Play Area – DA Acoustic Assessment – DA Acoustic Assessment – R3
Client:	Artemus Group

Revision	Description	Reference	Date	Prepared	Checked	Authorised
0	For Review – Draft 1	240573 - Manly Wharf - Balustrade, Pizza Oven and Kids Play Area - DA Acoustic Assessment - R0	06/09/24	Matthew Furlong	Matthew Furlong	Ben White
1	For Submission	240573 - Manly Wharf - Balustrade, Pizza Oven and Kids Play Area - DA Acoustic Assessment – R1	30/09/24	Matthew Furlong	Matthew Furlong	Ben White
2	Amended For Submission	240573 - Manly Wharf - Balustrade, Pizza Oven and Kids Play Area - DA Acoustic Assessment – R2	06/12/24	Matthew Furlong	Matthew Furlong	Ben White
3	Amended For Submission	240573 - Manly Wharf - Balustrade, Pizza Oven and Kids Play Area - DA Acoustic Assessment – R3	09/12/24	Matthew Furlong	Matthew Furlong	Ben White

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1 EXECUTIVE SUMMARY

Artemus Group proposes upgrades to the existing balustrade of the Manly Wharf, installation of two new Wood Fired Pizza Oven and associated preparation space within the Manly Wharf Hotel and an extension of the eastern deck of the Manly Wharf Hotel for the inclusion of a kids play space.

This report provides a noise and vibration impact assessment to support the project Development Application. The report has considered both the likely construction and operational impacts from the project and has presented reasonable and feasible management and mitigation measures to ensure the project can achieve the noise and vibration management levels and criteria outlined in this report.

Background noise logging was undertaken at three locations between Monday 6th May 2024 and Wednesday 15th May 2024. The measurements have been used to establish the projects operational project specific noise trigger levels.

A review of meteorological conditions of the local area identified that wind directions are predominantly from receiver to source, which would reduce noise levels rather than increase them. Regardless, this assessment has assessed the influence of adverse weather conditions on noise impacts at all sensitive receiver locations.

1.1 Operational Noise

Project specific noise trigger levels have been developed based on the ambient noise monitoring and the requirements of the EPAs Noise Policy for Industry (NPfI) requirements.

The noise modelling considered children noise and building services noise around the site. Children noise levels were assessed over the worst-case 15 minutes during the evening trade period.

All mechanical plant and equipment will be designed to comply with the relevant noise emissions requirements.

The predicted noise levels identified compliance with the applicable noise criteria is achieved with the inclusion of appropriate noise mitigation measures.

1.2 Summary

This report has identified that with the inclusion of appropriate noise management and mitigation measures, compliance with appropriate construction and operational noise and vibration criteria would be achieved. The mitigation recommendations in this report will be incorporated in the design of the project to ensure noise emitted from the development is appropriately controlled.

2 INTRODUCTION

Pulse White Noise Acoustics Pty Ltd (PWNA) have being engaged to undertake an acoustic assessment as part of the Development Application (DA) for the upgrades to the existing balustrade of the Manly Wharf, installation of new Wood Fired Pizza Oven and associated preparation space within the Manly Wharf Hotel and an extension of the eastern deck for the inclusion of a kids play space within the Manly Wharf Hotel.

As part of this assessment we have undertaken baseline acoustic surveys to determine the ambient noise level, formulation of relevant acoustic requirements applicable to the proposal, analysis of the likely acoustic impacts and development of acoustic mitigation measures to ensure compliance.

2.1 Relevant Guidelines

Acoustic criteria that have been adopted in this assessment include requirements from the following guidelines or legislative documents:

- Northern Beaches Council (Formerly Manly Council) Local Environmental Plan (LEP) and the Development Control Plan (DCP) 2013.
- NSW EPA Noise Policy for Industry (*NPI*) 2017.
- NSW EPA Road Noise Policy (*RNP*) 2011.

Note: All relevant project acoustic criteria is outlined in Appendix E of this report.

2.2 The Proposal

This section provides a detailed description of the proposed development. This section should be read in conjunction with the attached plans and documentation.

2.2.1 Summary of proposed development

The proposed development seeks approval for alterations and additions to Manly Wharf, which include the following.

- Removal of existing climbable and unsafe balustrades and the timber and concrete bench seats around the water's edge.
- Removal of timber balustrades that define the edge between the public promenade and the outdoor seating areas of The Bavarian and The Manly Wharf Hotel.
- Installation of new retractable glass balustrades to replace all removed balustrading.
- Revised awning arrangement to outdoor areas of The Manly Wharf Hotel, including removal of existing awnings, to be replaced with new operable awnings.
- Installation of a pizza preparation area including the replacement of an existing gas fired pizza oven with two solid fuel pizza ovens and one solid fuel grill in the existing Manly Wharf Hotel kitchen. The pizza ovens and grill will rely on the existing mechanical exhaust plant with no new penetrations required through the roof of the existing building.

- Extension of Manly Wharf Bar deck to enable construction of a children's play area, including a repurposed boat playground installation.

A separate liquor license application will seek an extension of the existing Manly Wharf Hotel license to provide for the service of alcohol within the extended wharf bar deck.

The proposal results in minor change to the seating type and layout within the extended deck area of Manly Wharf Hotel, to accommodate the children's play area. There will however be no increase in the patron capacity.

No change is proposed to the current trading hours of Manly Wharf Hotel.

2.2.2 Detailed description of proposal

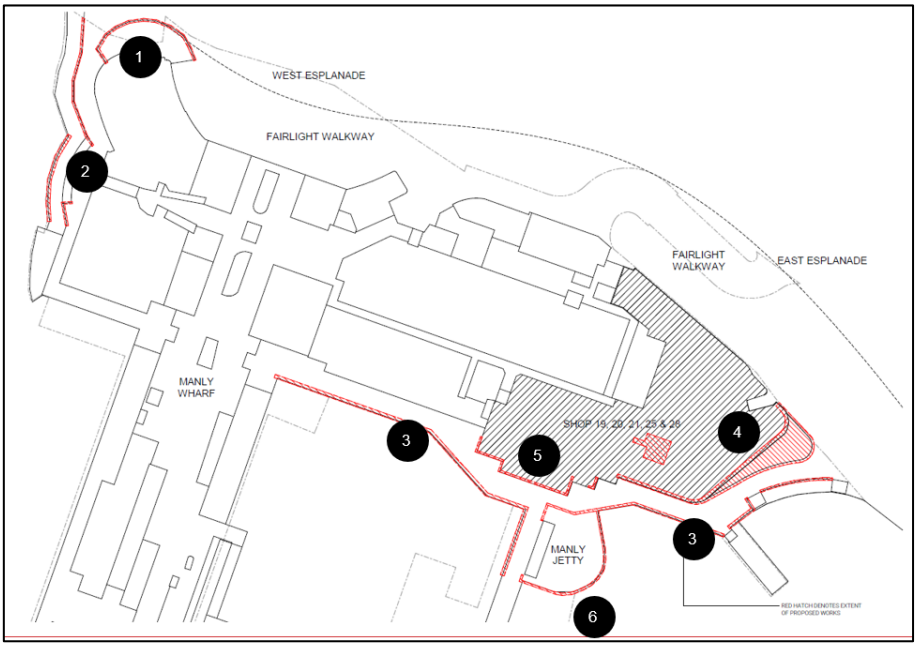
2.2.3 Alterations to existing balustrades

The proposed balustrade works are itemised in **Figure X** and described in detail as follows.

Table 1 Works vs. Locations

Numbered Item	Description of proposed works
1	Removal of existing timber balustrades and installation of new retractable glass balustrades around the edge between the public promenade and the outdoor dining area of The Bavarian, facing West Esplanade.
2	Removal of existing metal balustrades and installation of new retractable glass balustrades along the upper and lower walkway on the western edge of the public promenade facing Manly Cove.
3	Removal of existing metal balustrades and timber and concrete bench seats and installation of new retractable glass balustrades along the water's edge of the south and southeast public promenade.
4 & 5	Removal of existing timber balustrades surrounding Manly Wharf Hotel outdoor seating areas and installation of new retractable glass balustrades.
6	*Removal of existing metal balustrades and installation of new retractable glass balustrades along the water's edge surrounding the Manly Wharf Hotel jetty bar.*

Figure 1 Existing balustrades to be replaced by retractable glass balustrades

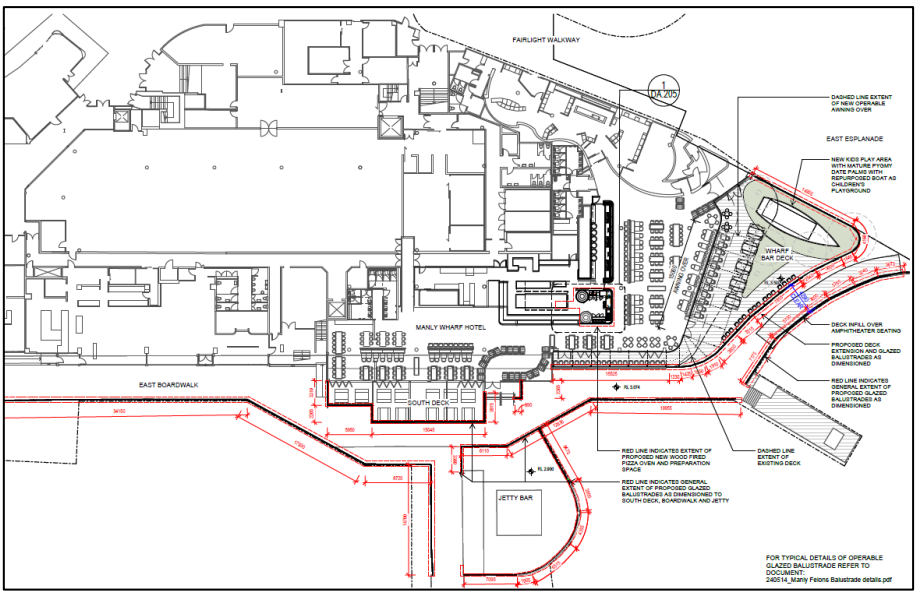


2.2.4 Glass balustrades

The proposed glass balustrades are 1,200mm high when retracted and have a maximum height of 1,800mm when extended to full height. The movement of the balustrades is mechanically assisted and can be raised or lowered by staff only.

The proposed balustrades will improve comfort and safety, sheltering the outdoor dining and seating areas, decks and walkways from high winds and cold temperatures. Further, the design of the glass balustrades is consistent with BCA standards.

Figure 2 Proposed balustrades around perimeter of Manly Wharf



2.2.5 Pizza preparation area

A new pizza preparation area including stone preparation benches and refrigeration equipment is proposed within the existing Manly Wharf Hotel kitchen, separated from the dining area via a lightweight plasterboard wall.

An existing gas oven in this area is proposed to be removed and replaced with two static classic wood ovens (CF-L0000-MI-130) from Forni Visciano and one solid fuel grill. The ovens are wood-fired with an exterior glass or ceramic mosaic finish. Further technical specifications for the ovens are provided at Appendix E.

The pizza oven and grill will utilise existing ducting and mechanical ventilation that services the existing gas oven. As a result, the proposal does not include any additional penetrations through the roof or walls for pipes, vents or HVAC systems and there will be no change to the existing building elevations.

The pizza ovens are proposed within a part of the building that contains no heritage significant fabric and can be removed without damaging any significant building fabric.

2.2.6 Deck extension and children's play area

The development proposes an extension of Manly Wharf Bar deck to enable construction of a children's play area, including a repurposed boat playground installation.

The path of travel along the eastern promenade will remain over 4 metres wide, allowing emergency vehicle access and maintaining easy egress for pedestrians.

While outdoor seating on the deck will be reconfigured to provide space for the play area, there will be no change to the current seating capacity.

Consistent with the site's context, the play area will feature a repurposed boat playground installation, surrounded by mature pygmy date palms to provide shade and a landscape setting for the play area. Hull elements of the boat installation have been removed to lower its overall height, ensuring it is of a suitable scale that integrates within the surrounding landscaped setting and does not result in any visual impacts or loss of water views from the public domain.

The play area is further protected from the elements via the installation of retractable glass balustrades around the perimeter of the wharf bar deck.

3 SURROUNDING EXTERNAL NOISE RECEIVERS

The nearest sensitive noise receivers to the site are identified below.

Table 2 Receiver Locations

Receiver Number #	Receiver Location	Number of Floors Assumed	Associated Noise Monitor (For the determination of RBLs)
R01	23 Commonwealth Parade, Manly	3	Location 2
R02	13 The Crescent, Manly	3	Location 2
R03	5 Commonwealth Parade, Manly	3	Location 2
R04	87 West Esplanade, Manly	3	Location 2
R05	85 West Esplanade, Manly	4	Location 2
R06	81 West Esplanade, Manly	10	Location 2
R07	77-78 West Esplanade, Manly	3	Location 3
R08	75-76 West Esplanade, Manly	3	Location 3
R09	1-3 Eustace Street, Manly	3	Location 3
R10	54-68 West Esplanade, Manly	6	Location 3
R11	53 East Esplanade, Manly	4	Location 3
R12	46-48 East Esplanade, Manly	3	Location 3
R13	43-45 East Esplanade, Manly	4	Location 3
R14 – A	41-42 East Esplanade, Manly	4	Location 3
R14 – B	41-42 East Esplanade, Manly	3	Location 3
R15	40 East Esplanade, Manly	4	Location 3
R16	39 East Esplanade, Manly	6	Location 3
R17	37-38 East Esplanade, Manly	9	Location 3
R18	35-36 East Esplanade, Manly	8	Location 3
R19	29 East Esplanade, Manly	1	Location 3
R20	2 Victoria Parade, Manly	3	Location 3
R21	27 East Esplanade, Manly	3	Location 3
R22	26 East Esplanade, Manly	3	Location 3
R23	24 East Esplanade, Manly	6	Location 3
R24	19 East Esplanade, Manly	2	Location 3
R25	15 East Esplanade, Manly	3	Location 3
R26	13 East Esplanade, Manly	9	Location 3
R27	9 East Esplanade, Manly	4	Location 1

R28	7 East Esplanade, Manly	4	Location 1
R29	5 East Esplanade, Manly	1	Location 1
R30	Manly 16ft Skiff Sailing Club (Corner East Esplanade &, Stuart Street, Manly)	1	Location 1

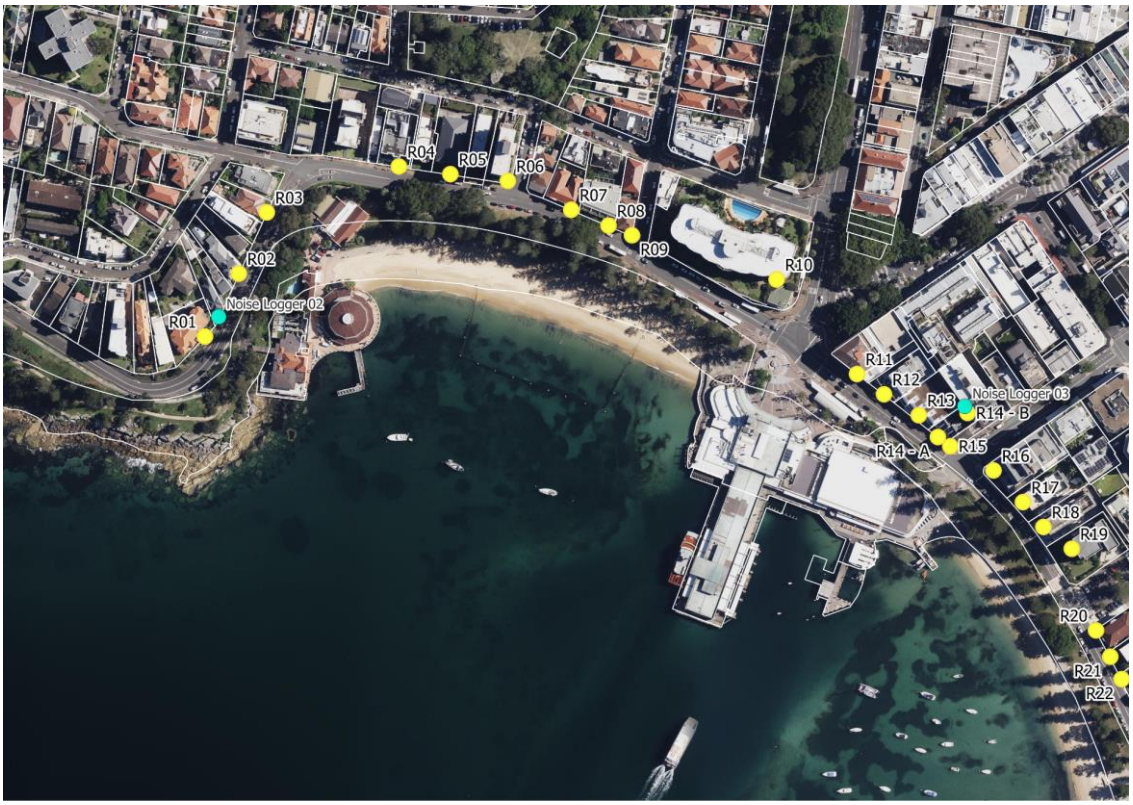
A map showing the site location as well as nearest receivers is provided in below. This figure also shows the location of onsite unattended measurements which were conducted as part of this assessment.

Figure 3 External Receiver Locations (Overview)

Note: A detailed view of the east and west is provided below.

Figure 4 External Receiver Locations (East View)

Figure 5 External Receiver Locations (West View)



4 OPERATIONAL NOISE EMISSION ASSESSMENT

Assessment of the potential noise emissions from the upgrades to the existing balustrade, installation of two (2) new Wood Fired Pizza Oven and the inclusion of the kids play space within the Manly Wharf Hotel are outlined below.

Each major component is discussed in detail below.

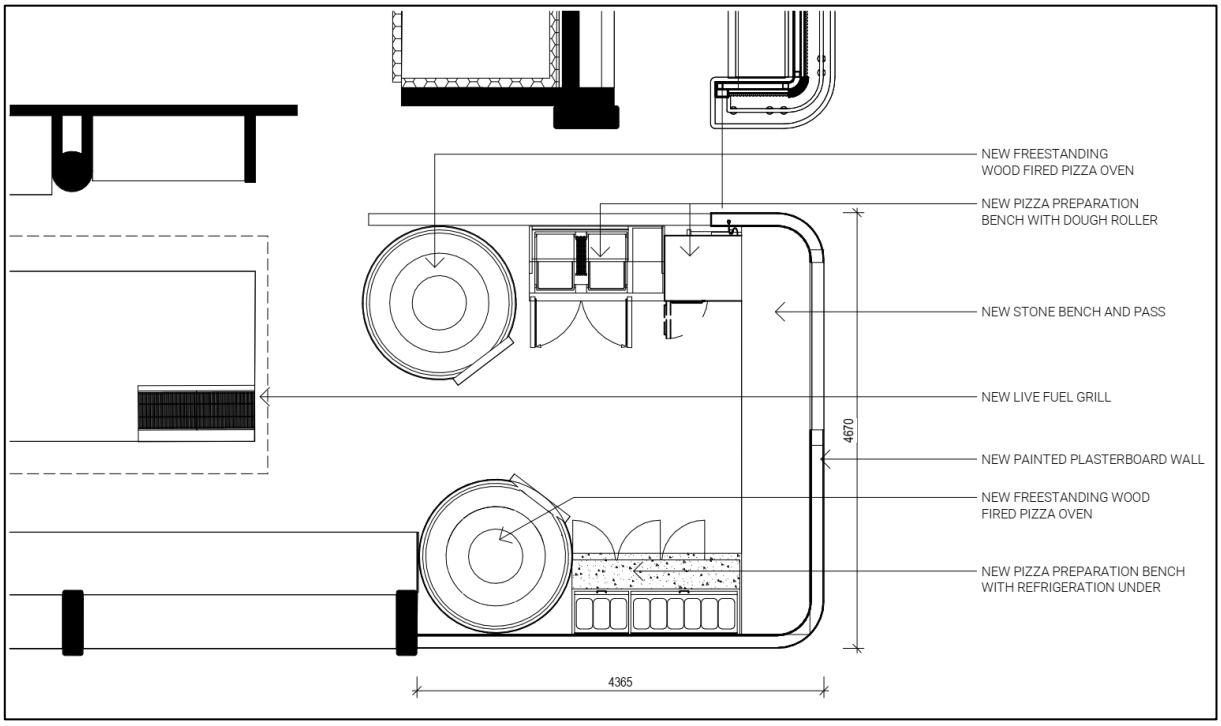
Note: All relevant project acoustic criteria is outlined in Appendix E of this report. All onsite unattended and attended noise measurements are detailed in Appendix B, C and D.

4.1 Noise from Engineering Services

Noise associated with the operation of all proposed engineering services whilst onsite must comply with the requirements listed in section D above. This includes (however not limited to) all mechanical plant (including ventilation systems and air conditioning plant), hydraulic plant (including hot water systems) and electrical systems.

A review of the proposed exhaust systems that will service the two (2) new wood ovens has been undertaken. The modelling identifies that acoustic treatment to an external discharge fan will be required to achieve compliance at neighbouring properties. Further details of this treatment will be developed during the detailed design phase.

Figure 6 Wood Fire Pizza Design



Further details of the acoustic treatment will be formulated during the detailed design phase once plant selections are made. However, in principle all proposed building services can achieve the site noise emission criteria.

Note: We would recommend a consent condition be imposed which requires a detailed acoustic review of all plant items to be undertaken as part of the Construction Certificate (CC) review.

4.2 Kids Play Area

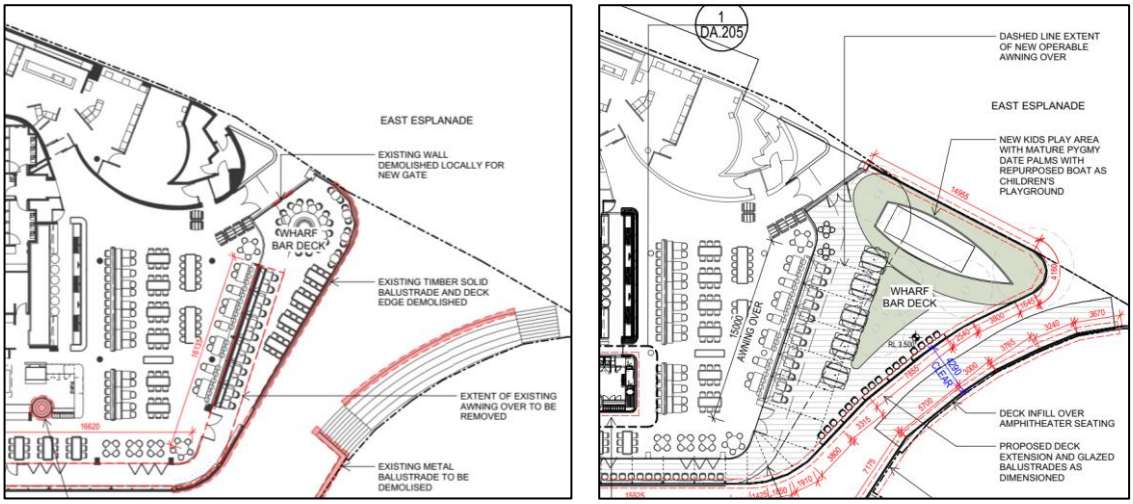
The proposal seeks approval for an extension of the eastern deck to include a dedicated space for a kids play area, see figure below. As part of the proposal the existing venue operational parameters are not looking to be changed (i.e. no additional patronage or operation hours will change), only the inclusion of a play space and re-alignment of the deck.

A detailed assessment of the proposal has been undertaken and the following is noted:

- Currently the eastern deck includes outdoor seating which is limited to 10:00pm. As mentioned above, this is not proposed to be altered.
- In accommodating the kids play area there has been an overall minor acoustic amendment and re-distribution of outdoor seating along the promenade.
- The inclusion of the kids outdoor play area provides a greater level of security and supervision to kids which are playing on the existing public grassed or beach area of the promenade which is not supervised or controlled.
- Being within the footprint of the venue, all existing management and security controls would supervise and control any noise emissions from the kids play area inline the existing operational requirements.
- The inclusion of a 1,800mm adjustable glazed screen (as shown on drawings) will provide greater levels of acoustic separation than the existing balustrade.
- Overall the likely noise impacts associated with the proposed re-alignment of the eastern deck including the kids play area will not result in any additional acoustic impacts to the neighbouring residents and will be managed in accordance with the onsite Plan of Management and venue procedures.

Figure 7 Existing vs. Proposed Eastern Deck

Existing Drawing **Proposed Drawing**



4.3 Summary of Acoustic Treatments

Based on the modelling outlined above the following acoustic treatments and or management controls are required to be implemented:

- Operational Hours:
  - No changes to the approved operation hours.
- Patrons:
  - No change to the permitted number of patrons.
- A contact number must be displayed for the purposes of receiving any complaints if they arrive.
- Signs must be displayed at all exits reminding patrons to be mindful of noise when leaving the premise.
- A detailed review of all new services to be installed as part of the works is to be reviewed prior to the issue of a Construction Certificate (CC) to ensure compliance with the relevant acoustic criteria as outlined in this report.

On the assumption that the recommendations outlined are incorporated compliance with the acoustic project criteria outlined in section 5 above will be achieved.

5 CONCULSION

Artemus Group proposes upgrades to the existing balustrade of the Manly Wharf, installation of two (2) new Wood Fired Pizza Oven and associated preparation space within the Manly Wharf Hotel and an extension of the eastern deck for the inclusion of a kids play space within the Manly Wharf Hotel.

Based on the detailed acoustic assessment above, we provide the following summary and conclusion:

- A review of the proposed exhaust systems that will service the two (2) new wood ovens has been undertaken. The modelling identifies that acoustic treatment to an external discharge fan will be required to achieve compliance at neighbouring properties. Further details of this treatment will be developed during the detailed design phase.

- Detailed acoustic modelling has indicated that noise from the operation of the addition of the kids play are has been undertaken and will result in compliance with the NSW EPA Noise Policy for Industry (NPI) 2017. To ensure compliance, recommended building and management controls are recommended in this report.

This report has identified that with the inclusion of appropriate noise management and mitigation measures, compliance with appropriate construction and operational noise and vibration criteria would be achieved. The mitigation recommendations in this report will be incorporated in the design of the project to ensure noise emitted from the development is appropriately controlled.

If you have any additional questions, please contact us should you have any further queries.

Regards,

Matthew Furlong
Principal Acoustic Engineer
PULSE WHITE NOISE ACOUSTICS PTY LTD

APPENDIX A. APPENDIX TERMINOLOGY

Sound power level	The total sound emitted by a source
Sound pressure level	The amount of sound at a specified point
Decibel [dB]	The measurement unit of sound
A Weighted decibels [dB(A])	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).
Decibel scale	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:
	0dB(A) Threshold of human hearing 30dB(A) A quiet country park 40dB(A) Whisper in a library 50dB(A) Open office space 70dB(A) Inside a car on a freeway 80dB(A) Outboard motor 90dB(A) Heavy truck pass-by 100dB(A) Jackhammer/Subway train 110 dB(A) Rock Concert 115dB(A) Limit of sound permitted in industry 120dB(A) 747 take off at 250 metres
Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.
Ambient sound	The all-encompassing sound at a point composed of sound from all sources near and far.
Equivalent continuous sound level [L_{eq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.
Reverberation	The persistence of sound in a space after the source of that sound has been stopped (the reverberation time is the time taken for a reverberant sound field to decrease by 60 dB)
Air-borne sound	The sound emitted directly from a source into the surrounding air, such as speech, television or music
Air-borne sound isolation	The reduction of airborne sound between two rooms.
Sound Reduction Index [R] *(Sound Transmission Loss)*	The ratio the sound incident on a partition to the sound transmitted by the partition.
Weighted sound reduction index [R_w]	A single figure representation of the air-borne sound insulation of a partition based upon the R values for each frequency measured in a laboratory environment.
C_{tr}	A value added to an R_w or $D_{nT,w}$ value to account for variations in the spectrum.
Energy Equivalent Sound Pressure Level [$L_{A,eq,T}$]	'A' weighted, energy averaged sound pressure level over the measurement period T.
Percentile Sound Pressure Level [$L_{Ax,T}$]	'A' weighted, sound pressure that is exceeded for percentile x of the measurement period T.
Speech Privacy	A non-technical term but one of common usage. Speech privacy and speech intelligibility are opposites and a high level of speech privacy means a low level of speech intelligibility. It should be recognised that acceptable levels of speech privacy do not require that speech from an adjacent room is inaudible.
Sound Pressure Level, LP dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound

	pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, Lw dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt
Noise Reduction	The difference in sound pressure level between any two areas. The term "noise reduction" does not specify any grade or performance quality unless accompanied by a specification of the units and conditions under which the units shall apply
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Background Sound Low	The average of the lowest levels of the sound levels measured in an affected area in the absence of noise from occupants and from unwanted, external ambient noise sources. Usually taken to mean the LA90 value
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
LMax	The maximum sound pressure level measured over a given period.
LMin	The minimum sound pressure level measured over a given period.
L1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L10	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L90	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
Leq	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.

APPENDIX B. UNATTENDED NOISE MONITORING INFORMATION

A. Unattended Noise Monitoring

Three unattended noise monitors were deployed to the site to survey existing background noise levels as well as ambient L_{Aeq} noise levels.

The monitoring location included three (3) different residential receiver locations around the site. As shown in the figure below, location 01 is a residential dwelling to the east of the Wharf (across the water) along East Esplanade. The second location was conducted directly across the road from the Wharf along the West Esplanade and the third location was along Commonwealth Parade across the water to the west of the site.

Onsite acoustic noise survey was conducted from Monday 6th May 2024 and Wednesday 15th May 2024. All data in the graphs presented in Appendix B, C and D have not been corrected (i.e., raw data is presented).

Instrumentation for the survey comprised of one (1) Rion NL-42 sound level meter (serial number 00396931), a Acoustic Research Laboratories (ARL) nGara Noise Monitor (serial number 87826E) and the third noise monitor was a Norsonic 139 sound level meter (serial number 1393013. Calibration of the monitors were checked prior to and following the measurements. Drift in calibration did not exceed ±0.5 dB. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

Due to an equipment malfunction, noise monitor location 01 only recorded a single 15-minute interval and did not record any other results for the monitoring period. Location 02 and 03 successfully recorded noise levels during the monitoring period. To determine resulting rating background noise levels at noise monitor location 01 an attended noise survey was conducted after access was not granted by the resident on a second attempt to re-conduct the noise monitoring, see section B below.

Charts presenting summaries of the measured daily noise data are attached in Appendix B for location 02 and Appendix C for location 03. The charts present each 24-hour period and show the L_{A10}, L_{Aeq} and L_{A90} noise levels for the corresponding 15-minute periods. This data has been filtered to remove periods affected by adverse weather conditions based on weather information.

Locations of the noise monitors are provided in Figure 8 below.

Based on the unattended noise measurements, the results of the survey have been presented below.

Figure 8 - Project Site Location - Sourced Sixmaps

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i. Results in accordance with the NSW EPA Noise Policy for Industry (NPI) 2017 (RBL's)

In order to assess the acoustical implications of the development at nearby noise sensitive receivers, the measured background noise data of the logger was processed in accordance with the NSW EPA's Noise Policy for Industry (NPI, 2017).

The Rating Background Noise Level (RBL) is the background noise level used for assessment purposes at the nearest potentially affected receiver. The noise monitor locations were chosen as they are representative locations for key residential areas around the site and are less impacted by other environmental noise such as harbour, road traffic and other venues within the manly area. It is the 90th percentile of the daily background noise levels during each assessment period, being day, evening and night. RBL $L_{A90\ (15minute)}$ and L_{Aeq} noise levels are presented in Table 3

Data affected by adverse meteorological conditions and by spurious and uncharacteristic events have been excluded from the results, and also excluded from the data used to determine the noise emission criteria. Meteorological information has been obtained from the Sydney Observatory Hill (ID 066214) which is located within 30 km. Levels presented below are processed results with extraneous weather events removed.

Table 3 Measured Ambient Noise Levels corresponding to the NPI's Assessment Time Periods

Measurement Location [4]	Daytime[1] 7:00 am to 6:00 pm		Evening[1] 6:00 pm to 10:00 pm		Night-time[1] 10:00 pm to 7:00 am	
	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)
Location 01 – East Esplanade (see Figure 8)	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]
Location 02 – Commonwealth Parade (see Figure 8)	51	64	47	62	43	56
Location 03 – West Esplanade (see Figure 8)	55	60	56	59	49	54

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

Note 2 *The LA90 noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.*

Note 3 *The LAeq is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.*

Note 4 *As described above, noise monitoring which was conducted at location 01 has an equipment malfunction and did not record extended noise levels.*

Based on analysis of the measured noise levels and onsite observations we note:

- As mentioned above, noise monitoring which was undertaken at location 1 had a malfunction during the initial acoustic survey. Upon discovering the technical error PWNA attempted to re-place the noise monitor to determine RBL's in accordance with the NSW EPA NPI 2017 again, however access was not permitted. As such an attended noise survey was undertaken to supplement the other acoustic surveys as outlined in the NSW EPA NPI 2017.

- Noise monitoring which was undertaken at location 2 is dominated by traffic noise along Commonwealth Parade during the day and evening period. During the night period this starts to become harbour dominated and distant urban dominated as the night period begins and through to early morning period when traffic flows start to begin for the following day.

- Noise levels at location 3 are dominated from existing urban noise from surrounding manly bay, harbour noise, wind noise and surrounding roadways.

ii. Results in accordance with the NSW Department of Planning, Housing and Infrastructure (DPHI) "Road Noise Policy"

In determining the required façade construction for the proposed building in accordance with the internal noise level requirements of Department of Planning, Housing and Infrastructure (DPHI) "Road Noise Policy", measured noise levels are shown based on the time periods defined by the SEPP below.

Data affected by adverse meteorological conditions and by spurious and uncharacteristic events have been excluded from the results, and also excluded from the data used to determine the noise emission criteria.

Table 4 Measured Ambient Noise Levels corresponding to the "Road Noise Policy" Assessment Time Periods

Measurement Location	Daytime [1] 7:00 am to 10:00 pm $L_{Aeq\ (whole\ period)}$ [2] (dBA)	Night-time [1] 10:00 pm to 7:00 am $L_{Aeq\ (whole\ period)}$ [2] (dBA)
Location 1 – East Esplanade (see Figure 8)	- [3]	- [3]
Location 2 – Commonwealth Parade (see Figure 8)	63	56
Location 3 – West Esplanade (see Figure 8)	60	54

Note 1 For Monday to Sunday, Daytime 7:00 am – 10:00 pm; Night-time 10:00 pm – 7:00 am.

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

Note 3 As described above, noise monitoring which was conducted at location 1 has an equipment malfunction and did not record extended noise levels.

iii. 1/1 Octave Results

In addition to the overall broadband noise levels identified above, the associated single octave (1/1) noise spectra are provided below.

Table 5 Measured Unattended Noise Monitor Single Octave (1/1) Spectra

Time Period	Parameter [1]	Octave Band Centre Frequency, Hz (dB)									Overall dBA
		31.5	63	125	250	500	1k	2k	4k	8k	
Location 1 – East Esplanade (see Figure 8)											
Day Period: 7:00am to 6:00pm	Measured L_{A90}	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]
Evening Period: 7:00am to 6:00pm	Measured L_{A90}	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]
Night Period: 10:00pm to 7:00am	Measured L_{A90}	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]	- [4]
Location 2 – Commonwealth Parade (see Figure 8)											
Day Period: 7:00am to 6:00pm	Measured L_{A90}	58	51	54	52	47	45	42	35	25	**51**

Evening Period: 7:00am to 6:00pm	Measured L_{A90}	48	42	48	49	44	41	37	31	20	**47**
Night Period: 10:00pm to 7:00am	Measured L_{A90}	45	41	46	45	40	38	35	28	19	**43**
Location 3 – West Esplanade (see Figure 8)											
Day Period: 7:00am to 6:00pm	Measured L_{A90}	62	55	58	56	51	49	46	39	29	**55**
Evening Period: 7:00am to 6:00pm	Measured L_{A90}	57	51	57	58	53	50	46	40	29	**56**
Night Period: 10:00pm to 7:00am	Measured L_{A90}	51	47	52	51	46	44	41	34	25	**49**

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

Note 2 *The LAeq is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.*

Note 3 *For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 1:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 8:00 am.*

Note 4 *As described above, noise monitoring which was conducted at location 1 has an equipment malfunction and did not record extended noise levels.*

B. Attended Noise Survey

In addition to the unattended noise surveys detailed above, onsite attended noise surveys have been undertaken around the site to support the measurements above.

Locations of the attended noise measurements are detailed in the figure above. Noise measurements have been undertaken at ground level along the common boundary to each property.

Attended noise level testing was undertaken using a Bruel and Kjaer 2270 Class 1 Type 1 Sound Level Meter (SLM). The meter was calibrated before and after testing and no significant drift was recorded. The attended and unattended noise locations were selected to obtain suitable noise levels for the assessment of background noise levels ($L_{90\,(t)}$) as well as the impact from traffic movements ($LAeq_{(t)}$).

The attended noise survey was attempted on Sunday 24th May 2024 between 4:30pm and 5:30pm, 9:00am and 10:00pm and 1:00am and 2:00am (following day)

Table 6 Measured Attended Noise Level Measurements – Broadband Levels

Measurement Location	Date and Time		Measured Noise Level (dBA)	
			$L_{A90\,(15\text{-minutes})}$ 1 (dBA)	$L_{Aeq\,(15\text{-minutes})}$ 2 (dBA)
Location A1 – East Esplanade – Behind Manly Yacht Club (see Figure 8)	Sunday 24th May 2024	4:30pm and 5:30pm	50	63
		9:00am and 10:00pm	48	59
	Monday 25th May 2024	1:00am and 2:00am	45	55
	Sunday 24th May 2024	4:30pm and 5:30pm	53	64
		9:00am and 10:00pm	50	57

Location A2 – Commonwealth Parade (see Figure 8)	Monday 25th May 2024	1:00am and 2:00am	46	49
Location A3 – East Esplanade (along Corso) (see Figure 8)	Sunday 24th May 2024	4:30pm and 5:30pm	60	65
		9:00am and 10:00pm	54	59
	Monday 25th May 2024	1:00am and 2:00am	52	58

Note 1 *The LA90 noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.*

Note 2 *The LAeq is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.*

In addition to the overall broadband noise levels identified above, the associated single octave (1/1) noise spectra are provided below.

Table 7 Measured Attended Noise Measurement – Single Octave (1/1) Spectra

Time Period	Parameter [1]	Octave Band Centre Frequency, Hz									Overall dBA
		31.5	63	125	250	500	1k	2k	4k	8k	
Location A1 – East Esplanade – Behind Manly Yacht Club (see Figure 8)											
Sunday 24th May 2024, 4:30pm and 5:30pm	Measured L_{A90}	57	55	51	47	47	45	41	32	20	**50**
Sunday 24th May 2024, 9:00am and 10:00pm	Measured L_{A90}	58	57	51	47	46	44	39	28	17	**48**
Monday 25th May 2024, 1:00am and 2:00am	Measured L_{A90}	60	52	47	44	42	40	36	29	22	**45**
Location A2 – Commonwealth Parade (see Figure 8)											
Sunday 24th May 2024, 4:30pm and 5:30pm	Measured L_{A90}	61	54	57	55	50	48	45	38	28	**53**
Sunday 24th May 2024, 9:00am and 10:00pm	Measured L_{A90}	51	45	51	52	47	44	40	34	23	**50**
Monday 25th May 2024, 1:00am and 2:00am	Measured L_{A90}	48	44	49	48	43	41	38	31	22	**46**
Location 3 – West Esplanade (see Figure 8)											
Sunday 24th May 2024, 4:30pm and 5:30pm	Measured L_{A90}	66	62	60	55	55	55	54	49	40	**60**
Sunday 24th May 2024, 9:00am and 10:00pm	Measured L_{A90}	58	63	59	52	50	50	46	39	25	**54**
Monday 25th May 2024, 1:00am and 2:00am	Measured L_{A90}	57	57	57	51	49	47	44	37	25	**52**

Note 1 *The LA90 noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.*

C. Summary of Measured Noise Levels

Based on the measured noise levels from both the attended and unattended noise surveys the resulting adopted Rating Background Noise Levels (RBL) for each of the receivers are summarised below.

Locations which included both an attended and unattended noise survey, the unattended noise survey was adopted in lieu of the attended noise survey as they are generally lower noise levels and representative of the existing acoustic environment.

Table 8 Summary of Assumed Rating Background Noise Levels (RBL) including Single Octave (1/1) Spectra for surrounding receivers

Time Period	Parameter [1]	Octave Band Centre Frequency, Hz (dB)									Overall dBA
		31.5	63	125	250	500	1k	2k	4k	8k	
Receivers R01 to R06											
(Based on unattended noise monitor located at ***L02*** (Commonwealth Parade see Figure 8)											
Day Period: 7:00am to 6:00pm	Measured L_{A90}	58	51	54	52	47	45	42	35	25	**51**
Evening Period: 7:00am to 6:00pm	Measured L_{A90}	48	42	48	49	44	41	37	31	20	**47**
Night Period: 10:00pm to 7:00am	Measured L_{A90}	45	41	46	45	40	38	35	28	19	**43**
Receivers R07 to R26											
(Based on unattended noise monitor located at ***L03*** (East Esplanade see Figure 8)											
Day Period: 7:00am to 6:00pm	Measured L_{A90}	62	55	58	56	51	49	46	39	29	**55**
Evening Period: 7:00am to 6:00pm	Measured L_{A90}	57	51	57	58	53	50	46	40	29	**56**
Night Period: 10:00pm to 7:00am	Measured L_{A90}	51	47	52	51	46	44	41	34	25	**49**
Receivers R27 to R30											
(Based on the attended noise survey conducted at ***A1*** (see Figure 8))											
Day Period: 7:00am to 6:00pm	Measured L_{A90}	57	55	51	47	47	45	41	32	20	**50**
Evening Period: 7:00am to 6:00pm	Measured L_{A90}	58	57	51	47	46	44	39	28	17	**48**
Night Period: 10:00pm to 7:00am	Measured L_{A90}	60	52	47	44	42	40	36	29	22	**45**

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

Note 2 For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 1:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 8:00 am.

APPENDIX C. UNATTENDED NOISE MONITOR – LOCATION 02

Weather Station: Sydney Observatory Hill

Weather Station ID: 066214

Co-ordinates: Lat: -33.86 s, Lon: 151.20 E, 44 m Height

Figure 9 Unattended Noise Monitor Photo

15 Commonwealth Parade, Manly

Ambient noise monitoring report

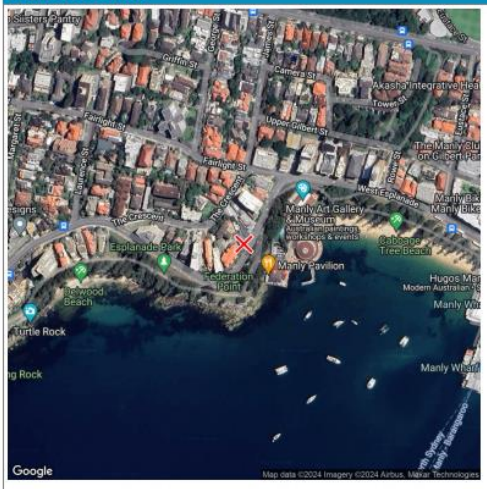
Item	Information
Logger Type	NGARA
Serial number	87826E
Address	15 Commonwealth Parade, Manly
Location	6 E Esplanade, Manly
Facade / free field	Free field
Environment	

Measured noise levels

Logging date	Rating Background Level			$L_{Aeq,period}$		
	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am
Mon 06 May 2024	-	50	-	64	61	55
Tue 07 May 2024	51	45	43	64	62	56
Wed 08 May 2024	50	48	40	65	62	56
Thu 09 May 2024	50	47	41	64	61	56
Fri 10 May 2024	51	51	43	64	63	56
Sat 11 May 2024	51	51	43	65	63	57
Sun 12 May 2024	48	44	44	64	63	56
Mon 13 May 2024	51	44	42	64	60	55
Tue 14 May 2024	-	-	-	64	-	55
Summary	**51**	**47**	**43**	**64**	**62**	**56**

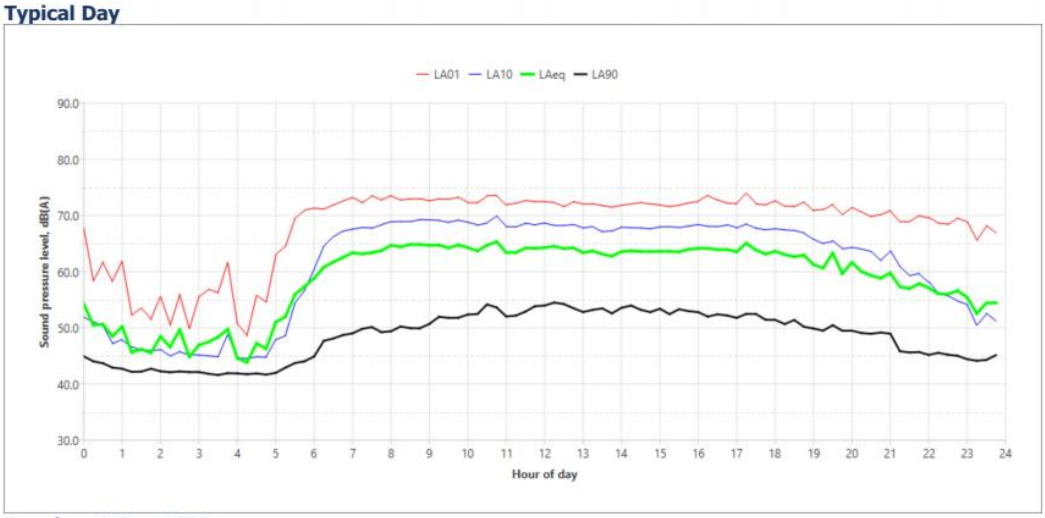
Note: Results with a '-' identify that there were not enough measurements available to correctly calculate the level, in accordance with the Noise Policy for Industry. The data has been excluded either from weather or manual exclusions. See the charts for more information

Logger location

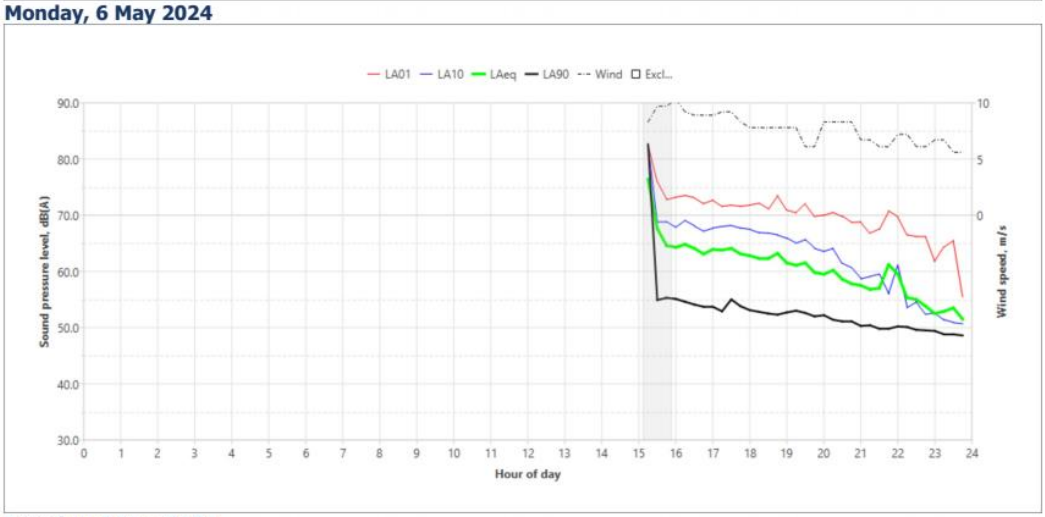


Logger deployment photo

Typical Day



Monday, 6 May 2024



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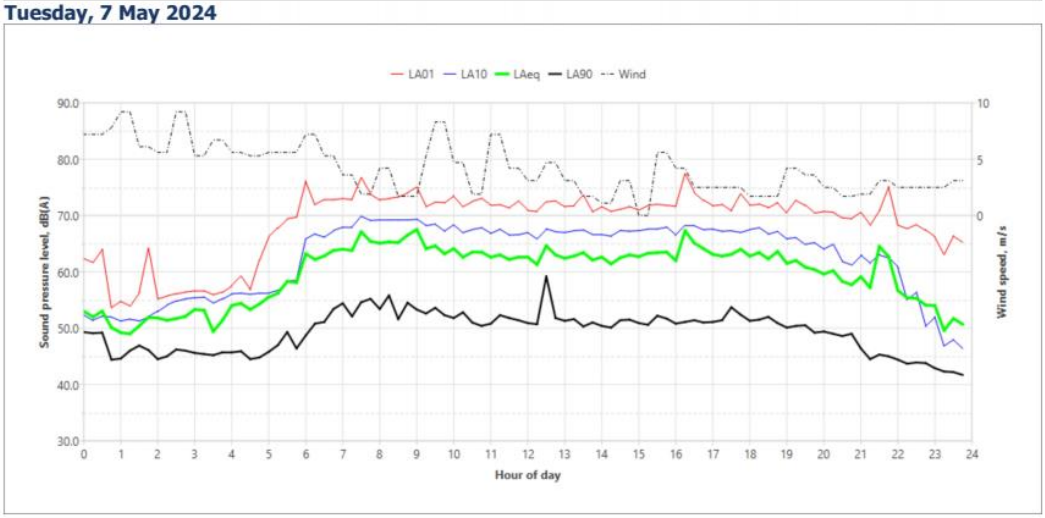
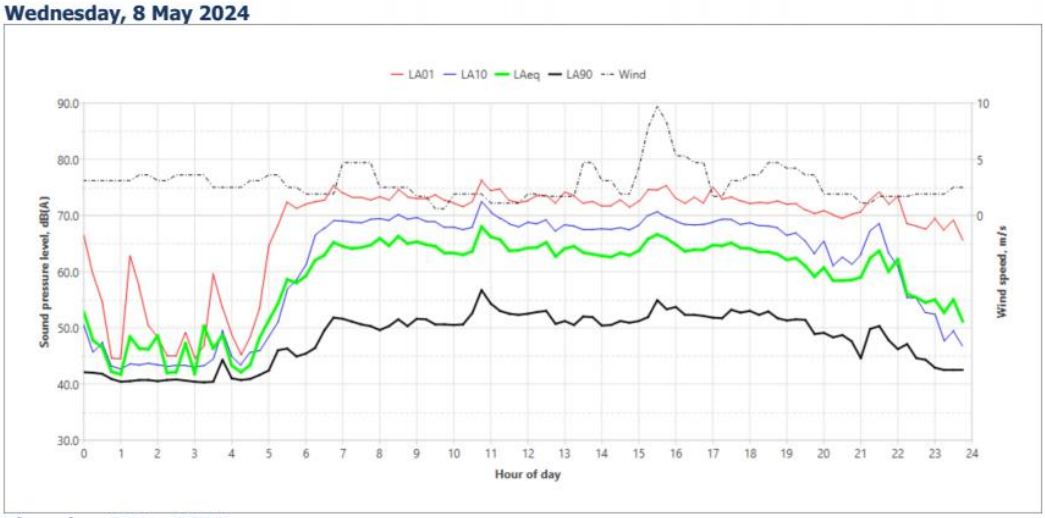


15 Commonwealth Parade, Manly

Page 2

Wednesday, 8 May 2024



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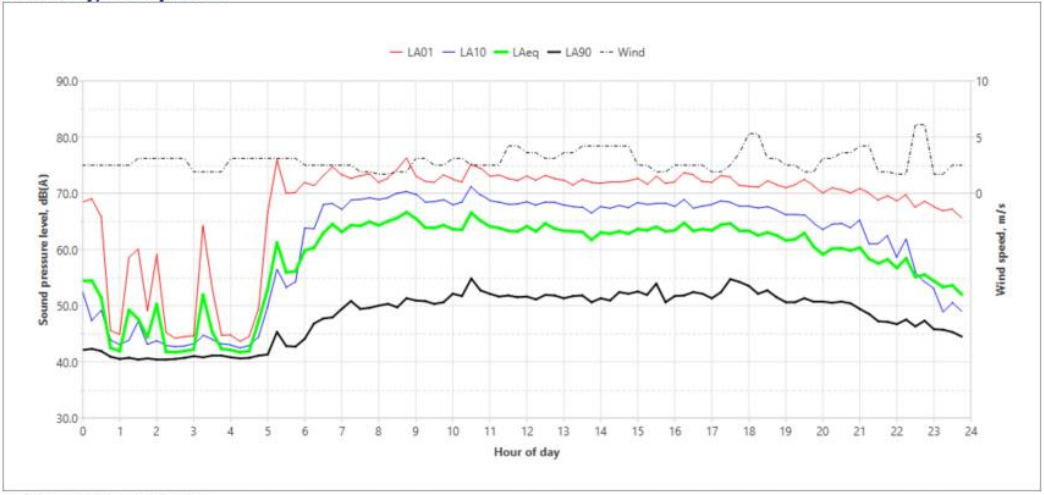
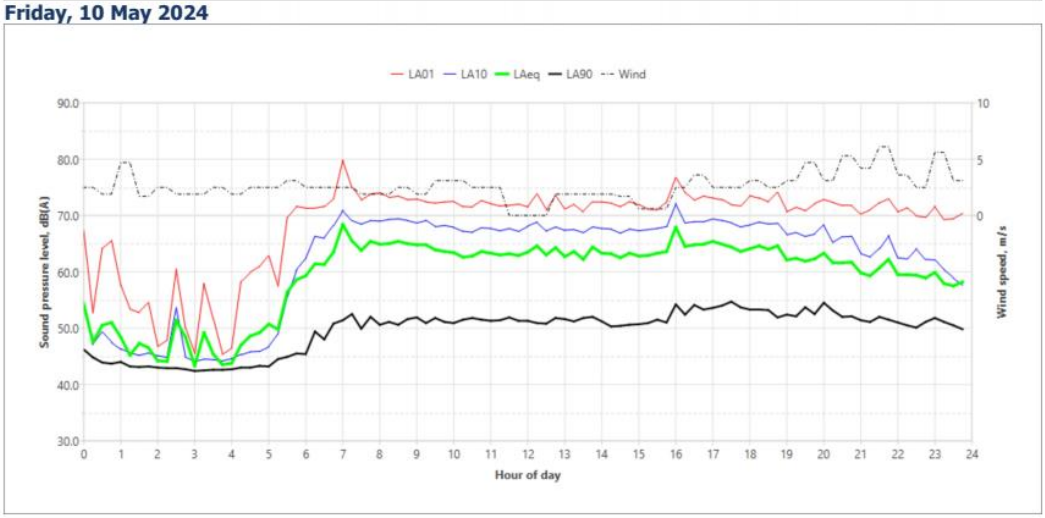


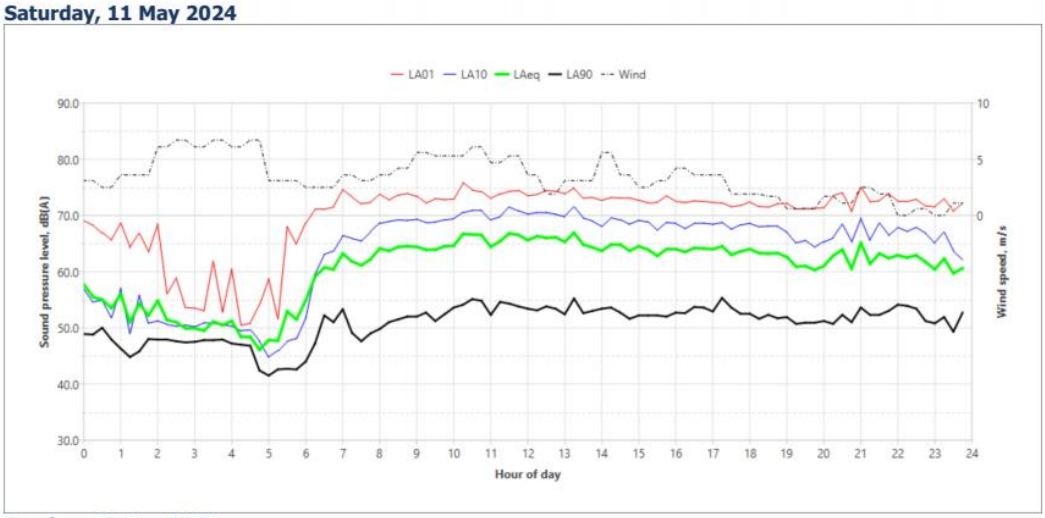
Friday, 10 May 2024



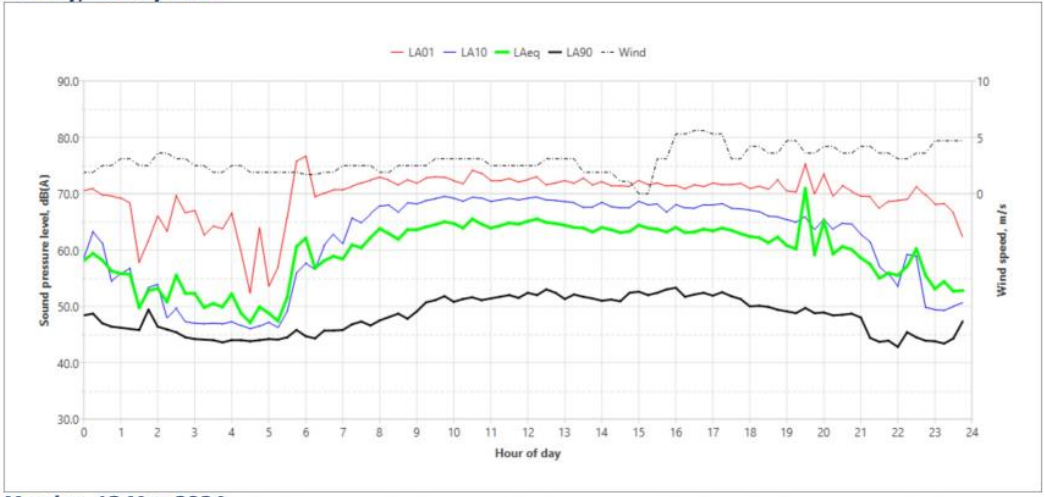
15 Commonwealth Parade, Manly

Page 3

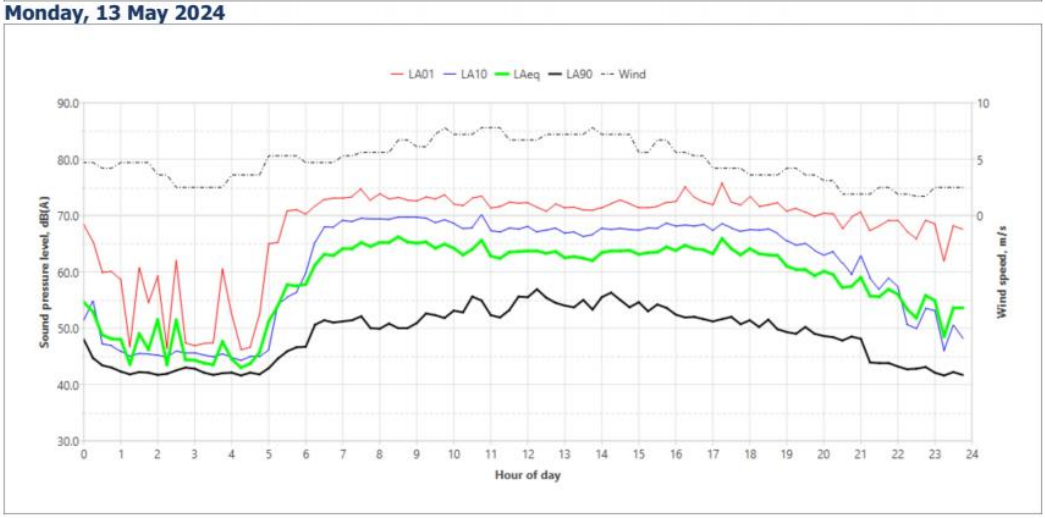
Saturday, 11 May 2024



Sunday, 12 May 2024



Monday, 13 May 2024



15 Commonwealth Parade, Manly

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APPENDIX D. UNATTENDED NOISE MONITOR – LOCATION 03

Weather Station: Sydney Observatory Hill

Weather Station ID: 066214

Co-ordinates: Lat: -33.86 s, Lon: 151.20 E, 44 m Height

Figure 10 Unattended Noise Monitor Photo

42 E Esplanade, Manly

Ambient noise monitoring report

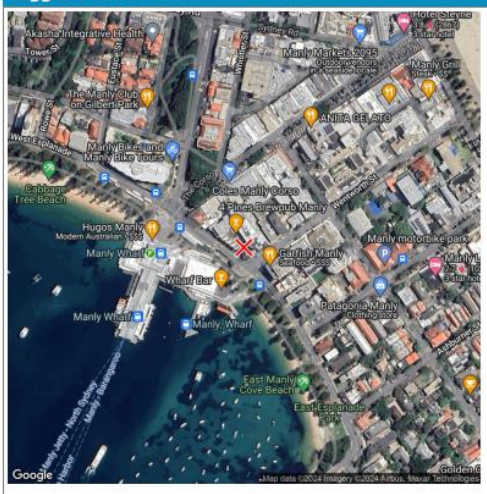
Item	Information
Logger Type	Norsonic
Serial number	1393013
Address	42 E Esplanade, Manly
Location	42 E Esplanade, Manly
Facade / free field	Free field
Environment	

Measured noise levels

Logging date	Rating Background Level			$L_{Aeq,period}$		
	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am
Mon 06 May 2024	-	56	-	61	59	56
Tue 07 May 2024	56	56	52	59	58	55
Wed 08 May 2024	54	57	49	59	59	54
Thu 09 May 2024	54	56	49	59	58	53
Fri 10 May 2024	55	57	49	59	59	54
Sat 11 May 2024	53	58	48	59	61	56
Sun 12 May 2024	54	56	53	59	58	55
Mon 13 May 2024	56	56	50	62	58	54
Tue 14 May 2024	56	56	50	60	58	54
Wed 15 May 2024	-	-	-	59	-	53
Summary	**55**	**56**	**49**	**60**	**59**	**54**

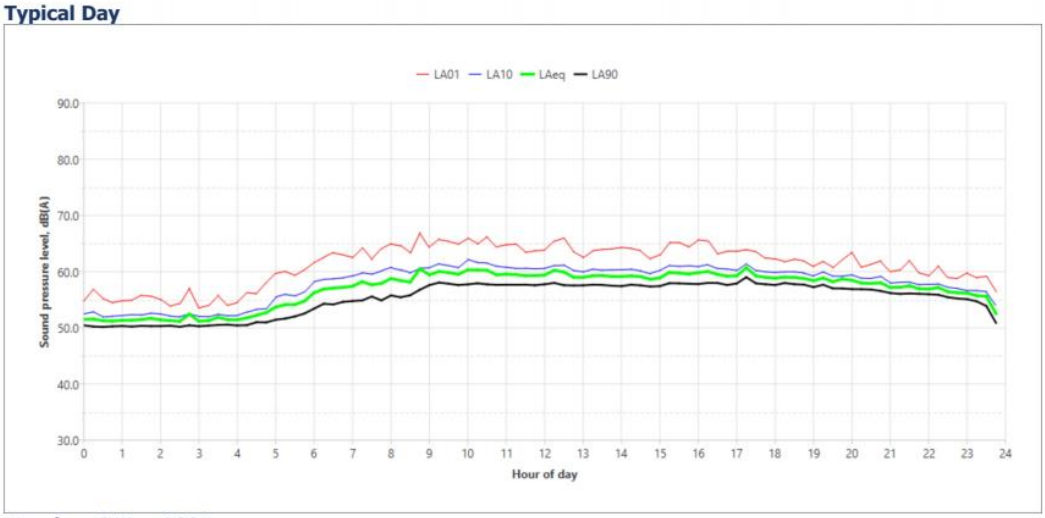
Note: Results with a '-' identify that there were not enough measurements available to correctly calculate the level, in accordance with the Noise Policy for Industry. The data has been excluded either from weather or manual exclusions. See the charts for more information

Logger location



Logger deployment photo

Typical Day



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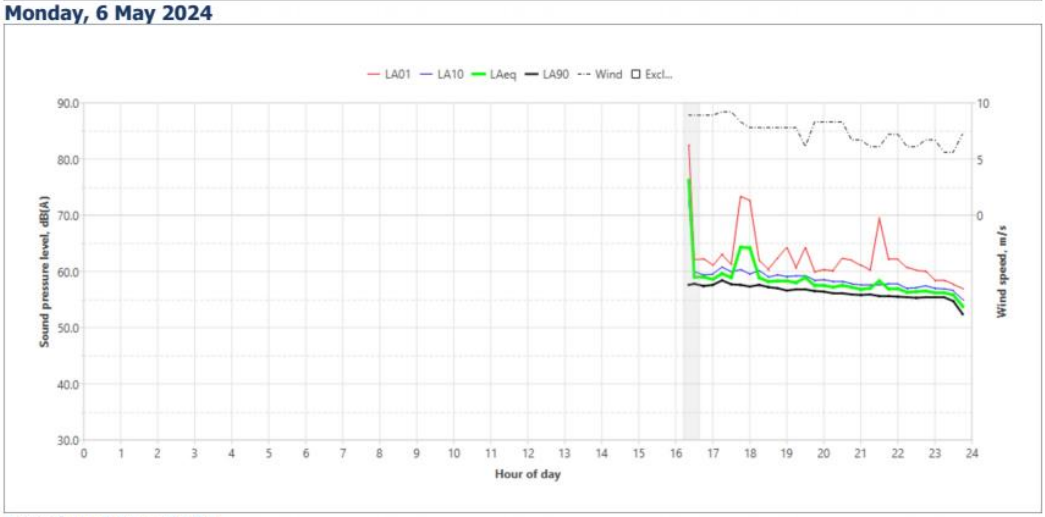

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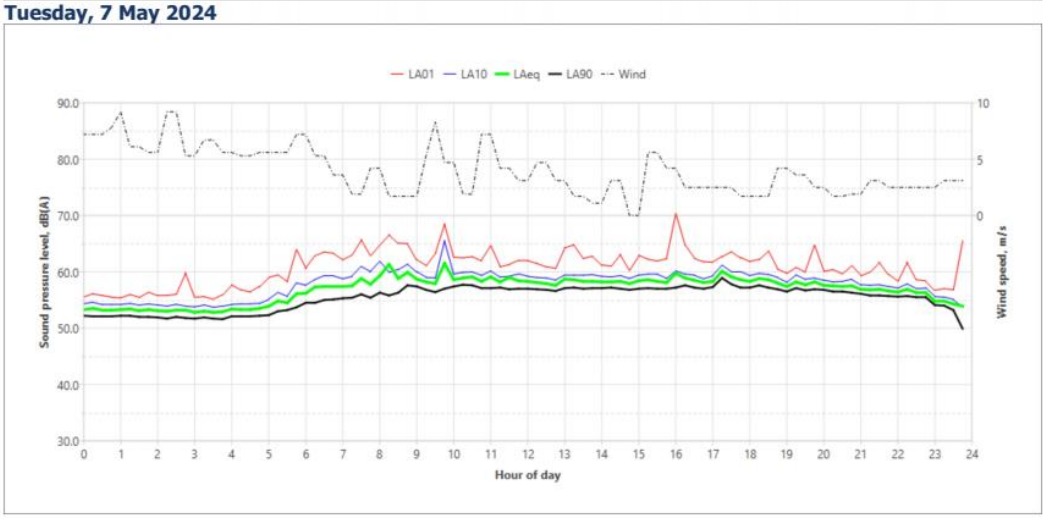

42 E Esplanade, Manly

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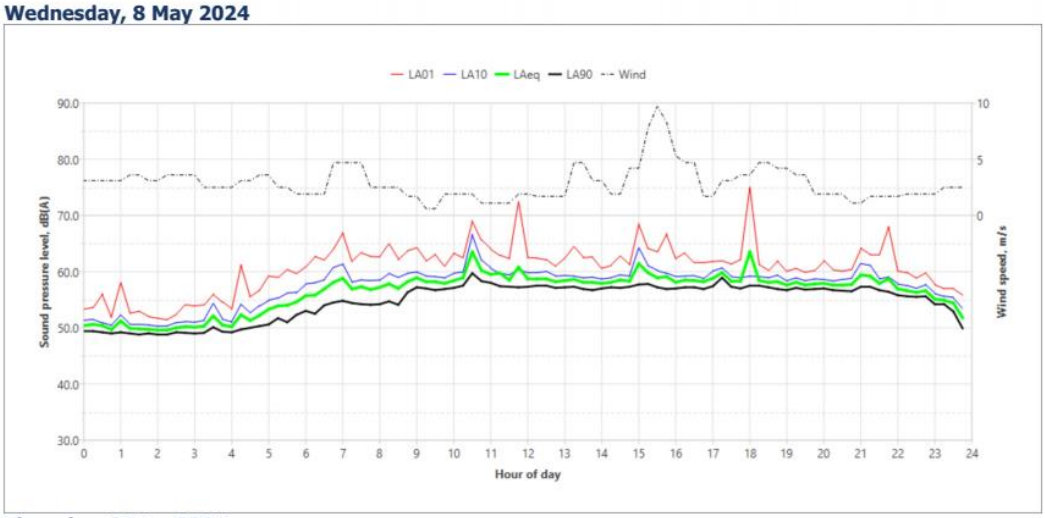
Wednesday, 8 May 2024



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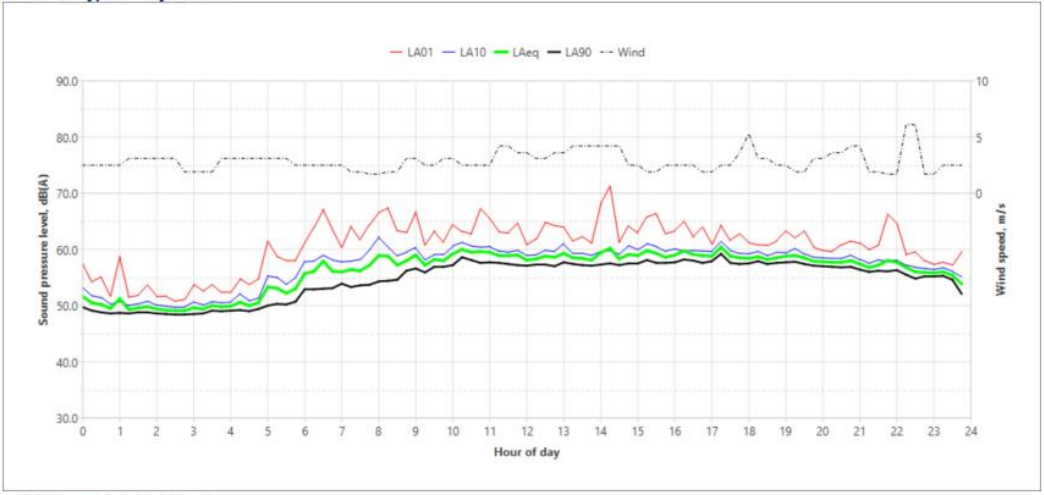
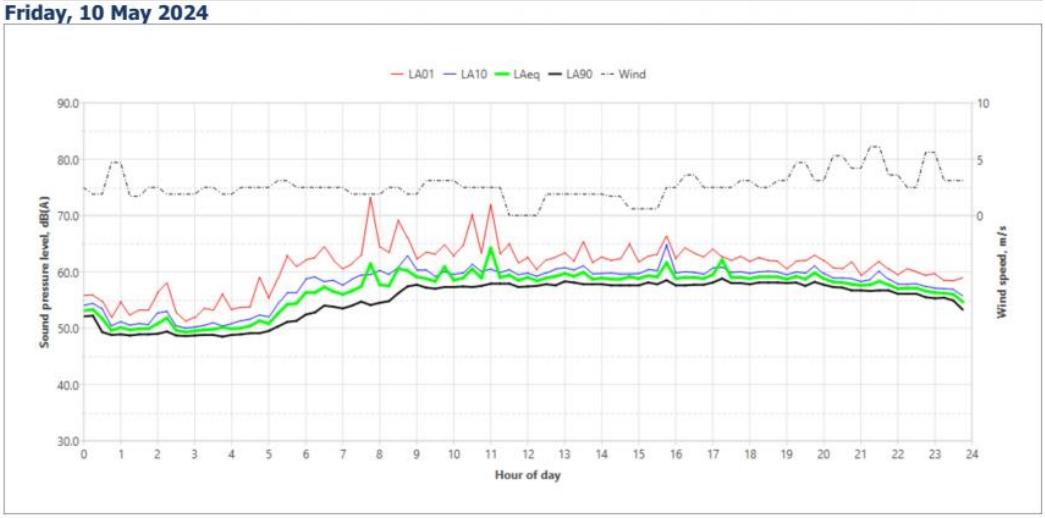


Friday, 10 May 2024



42 E Esplanade, Manly

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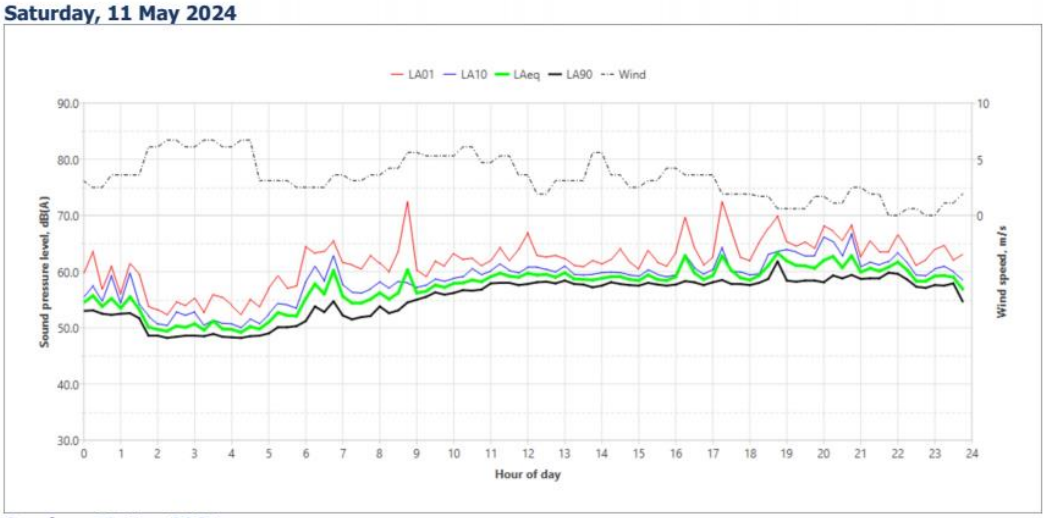
Saturday, 11 May 2024



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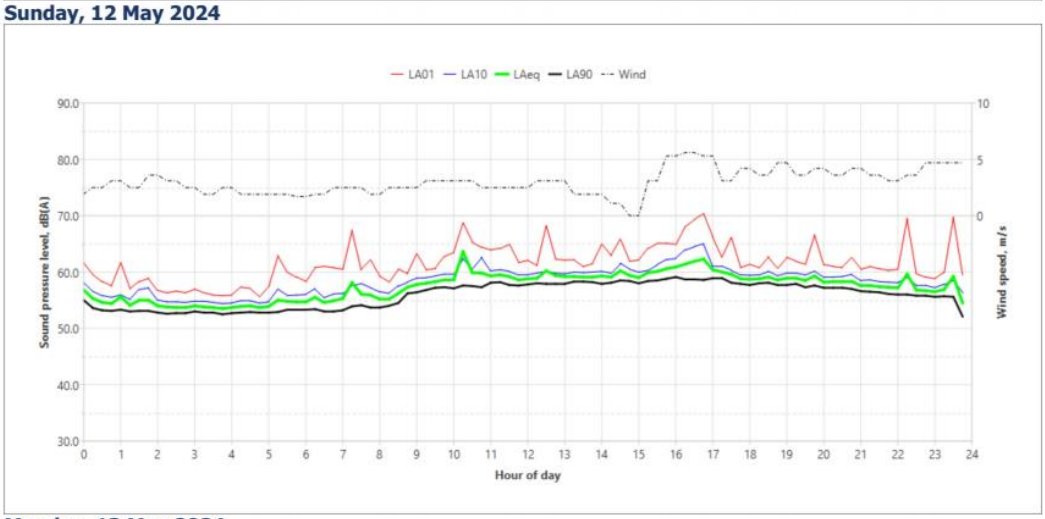

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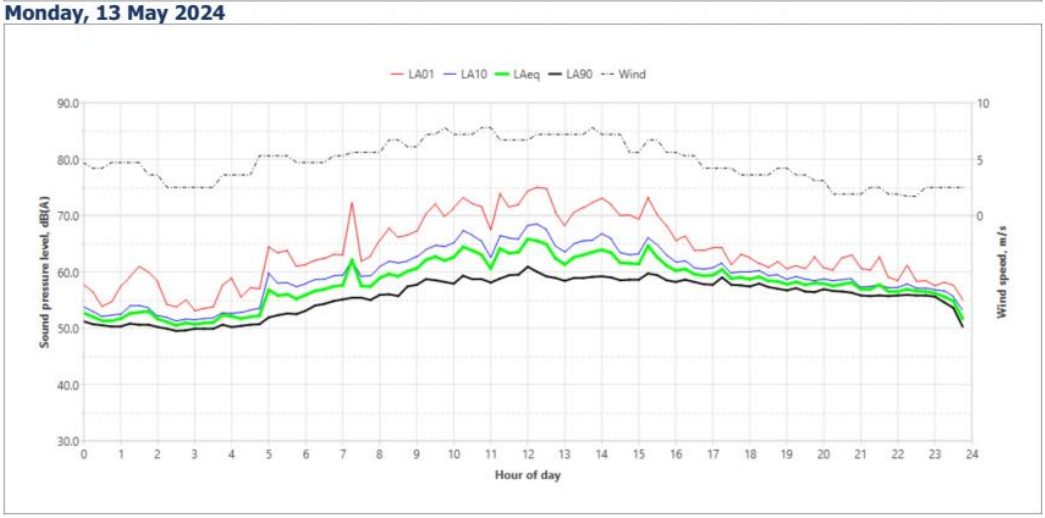

42 E Esplanade, Manly

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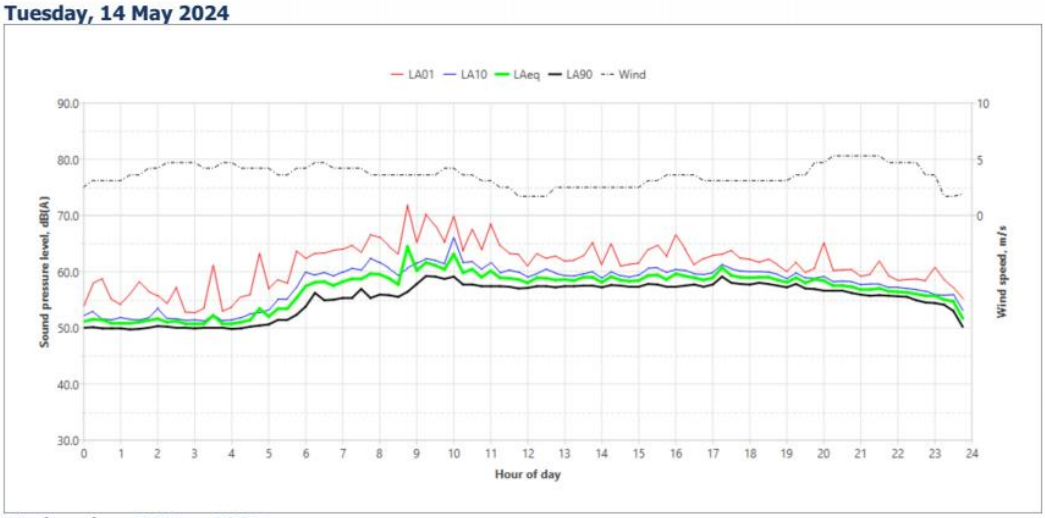
Tuesday, 14 May 2024



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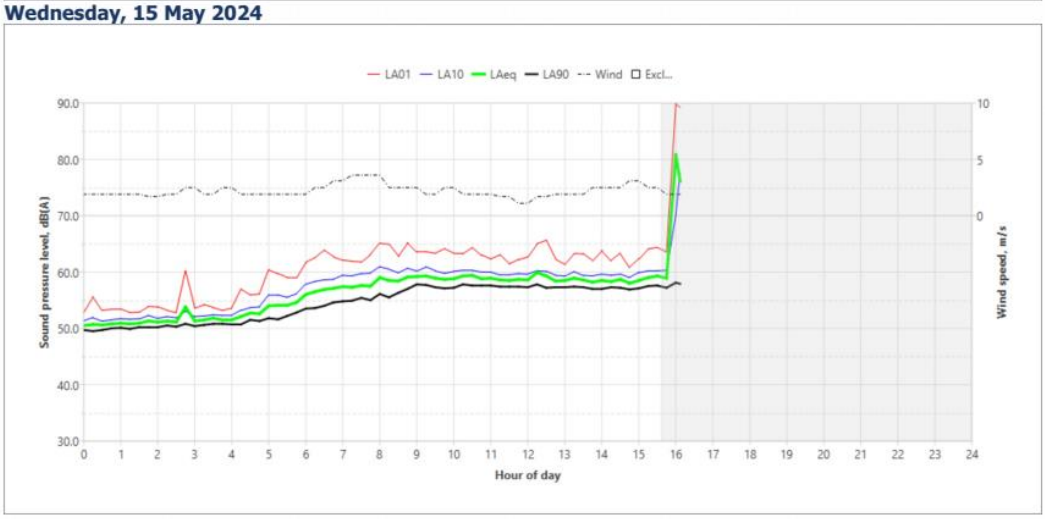

42 E Esplanade, Manly

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APPENDIX E. ACOUSTIC CRITERIA

All relevant noise and vibration criteria for the project is presented below. It has been separated into two main components: external noise emission criteria and construction noise/vibration criteria. Each are discussed in detail below.

D. External Noise Emission Criteria

iv. Northern Beaches Council (Formerly Manly Council) Local Environmental Plan (LEP) 2013 & Development Control Plan (DCP) 2013

Acoustic requirements relevant to noise emitted from the building are not provided in the Manly Council LEP or DCP documents. Therefore, requirements of the NSW EPA NPI 2017, NSW Liquor and Gaming Acoustic Requirements and NSW EPA RNP 2011 will be adopted. Each is discussed in detail below.

v. NSW EPA Noise Policy for Industry (NPI) 2017

(Assessment of Building Services & Onsite Vehicles)

In NSW, the control of noise emissions is the responsibility of Local Governments and the NSW Environment Protection Authority (NSW EPA).

The NSW EPA has recently released a document titled Noise Policy for Industry (NSW NPI) which provides a framework and process for determining external noise criteria for the assessment of noise emission from industrial developments. The NSW NPI criteria for industrial noise sources have two components:

- Controlling the intrusive noise impacts for residents and other sensitive receivers in the short term; and
- Maintaining noise level amenity of particular land uses for residents and sensitive receivers in other land uses.

a. Intrusive Noise Impacts (Residential Receivers)

The NSW NPI states that the noise from any single source should not intrude greatly above the prevailing background noise level. Industrial noises are generally considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (L_{Aeq}), measured over a 15-minute period, does not exceed the background noise level measured in the absence of the source by more than 5 dB(A). This is often termed the Intrusiveness Criterion.

The 'Rating Background Level' (RBL) is the background noise level to be used for assessment purposes and is determined by the methods given in the NSW NPI. Using the rating background noise level approach results in the intrusiveness criterion being met for 90% of the time. Adjustments are to be applied to the level of noise produced by the source that is received at the assessment point where the noise source contains annoying characteristics such as tonality or impulsiveness.

b. Protecting Noise Amenity (All Receivers)

To limit continuing increase in noise levels, the maximum ambient noise level within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in Table 2.2 of the NSW NPI. That is, the ambient LAeq noise level should not exceed the level appropriate for the locality and land use. This is often termed the 'Background Creep' or Amenity Criterion.

The amenity assessment is based on noise criteria specified for a particular land use and corresponding sensitivity to noise. The cumulative effect of noise from industrial sources needs to be considered in assessing the impact.

These criteria relate only to other continuous industrial-type noise and do not include road, rail or community noise. If the existing (measured) industrial-type noise level approaches the criterion value, then the NSW NPI sets maximum noise emission levels from new sources with the objective of ensuring that the cumulative levels do not significantly exceed the criterion.

Project amenity noise level for industrial developments is specified as the recommended amenity noise level (Table 2.2 of the NPI) minus 5 dB(A). To standardise the time periods for the intrusiveness and amenity noise levels, this policy assumes that the LAeq,15min will be taken to be equal to the $L_{Aeq,period}$ + 3 decibels (dB).

Where the resultant project amenity noise level is 10 dB or more lower than the existing traffic noise level, the project amenity noise levels can be set at 15 dB below existing traffic noise levels (i.e. $L_{Aeq,period(traffic)}$ *minus 15 dBA*).

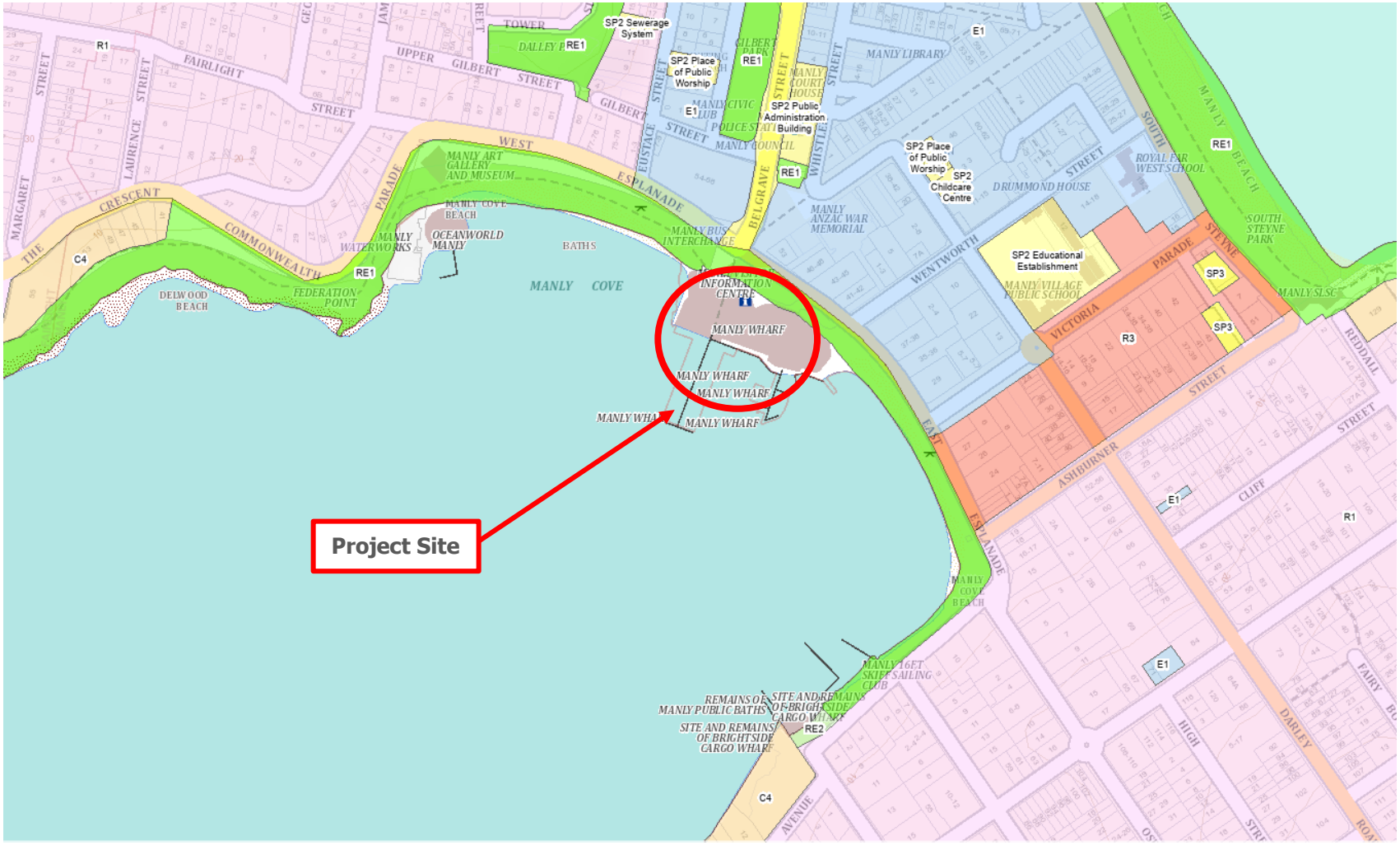
c. Residential Receivers – Area Classification

The NSW NPI characteristics the "Urban Residential" noise environment as an area that has the following characteristics:

- Urban – an area with an acoustical environment that:
    - Is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, most traffic and/or industrial related sound sources
    - Has through=traffic with characteristically heavy and continuous traffic flows during peak periods.
    - Is near commercial districts or industrial districts.
    - Has any combination of the above.

As shown below, the site and its surrounding receivers are within an area made up of R1, R3, E1 and C4 type developments. Based on classifications, measured ambient noise levels and description and using table 2.3 of the NPI (see below), we believe that the most appropriate classification for the development site is Urban.

Figure 11 – NSW ePlanning Spatial Viewer



As shown above, the nearest surrounding receivers are within an area made up of R1, E1, and R3 type developments (General Residential, Local Centre, and Medium Density Residential respectively). Based on classification of the surrounding land uses and the measured background noise levels, the most appropriate classification is urban.

Figure 12 - NPI Extract - Table 2.3 Determining which of the residential receiver categories applies

Table 2.3: Determining which of the residential receiver categories applies.

Receiver category	Typical planning zoning – standard instrument*	Typical existing background noise levels	Description
Rural residential	RU1 – primary production RU2 – rural landscape RU4 – primary production small lots R5 – large lot residential E4 – environmental living	Daytime RBL <40 dB(A) Evening RBL <35 dB(A) Night RBL <30 dB(A)	**Rural** – an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse. Note: Where background noise levels are higher than those presented in column 3 due to existing industry or intensive agricultural activities, the selection of a higher noise amenity area should be considered.
Suburban residential	RU5 – village RU6 – transition R2 – low density residential R3 – medium density residential E2 – environmental conservation E3 – environmental management	Daytime RBL<45 dB(A) Evening RBL<40 dB(A) Night RBL <35dB(A)	**Suburban** – an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.
Urban residential	R1 – general residential R4 – high density residential B1 – neighbourhood centre (boarding houses and shop-top housing) B2 – local centre (boarding houses) B4 – mixed use	Daytime RBL> 45 dB(A) Evening RBL> 40 dB(A) Night RBL >35 dB(A)	**Urban** – an area with an acoustical environment that: • is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources • has through-traffic with characteristically heavy and continuous traffic flows during peak periods • is near commercial districts or industrial districts • has any combination of the above.

Notes: *As cited in Standard Instrument – Principal Local Environmental Plan, New South Wales Government, Version 15 August 2014. RBL = rating background noise level.

Resultant amenity levels for Urban receivers and other surrounding land uses are shown below.

Table 9 NSW NPI – Recommended L_{Aeq} Noise Levels from Noise Sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day[1]	Recommended Amenity Noise Level ($L_{Aeq, period}$)[2] (dBA)
Residence	Urban	Day	60
		Evening	50
		Night	45
Commercial premises	-	When in use	65

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

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

d. Maximum Noise Level Event (Sleeping Disturbance)

Section 2.5 of the NPI states the following:

> The potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.
>
> Where the subject development/premises night-time noise levels at a residential location exceed:
>
> - $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
> - L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,
>
> a detailed maximum noise level event assessment should be undertaken.

As outlined in sections above, the measured rating background noise level during the night hours (10:00pm to 7:00am) were:

- 43 dBA L_{A90} for Receivers R01 to R06.
- 49 dBA L_{A90} for Receivers R07 to R26.
- 45 dBA L_{A90} for Receivers R27 to R30.

Therefore, the resultant RBL + 15 dB is **58 dBA** for receivers R01 to R06, **64 dBA** for receivers R06 to R26 and **60 dBA** for receivers R27 to R30 will be adopted for this assessment.

For the RBL + 5 dB is **58 dBA** for receivers R01 to R06, **54 dBA** for receivers R06 to R26 and **50 dBA** for receivers R27 to R30 will be adopted for this assessment.

e. Project Specific External Noise Emission Criteria

(Assessment of Building Services and onsite vehicle noise)

The intrusive, amenity and maximum noise event criteria for noise emissions, derived from the measured data, are presented in Table 10. These criteria are nominated for the purpose of determining the operational noise limits for building services associated with the development which can potentially affect noise sensitive receivers.

For each assessment period, the lower (i.e., the more stringent) of the amenity or intrusive criteria are adopted. These are shown in bold text in Table 10.

Table 10 External noise level criteria in accordance with the NSW NPI

Receiver Locations	Time of Day [1]	Project Amenity Noise Level, $L_{Aeq, period}$ [2 4] (dBA)	Measured $L_{A90, 15\ min}$ (RBL) [3] (dBA)	Measured $L_{Aeq, period}$ Noise Level [4] (dBA)	Intrusive $L_{Aeq, 15\ min\ Criterion}$ [4] for New Sources (dBA)	Amenity $L_{Aeq, 15\ min\ Criterion}$ [4 5] for New Sources (dBA)
Receivers R01-R06	Day	55	51	64	**56**	58
	Evening	45	47	62	52	**48**
	Night	40	43	56	48	**43**
Receivers R07-R26	Day	55	55	60	60	**58**
	Evening	45	56	59	~~61~~ (60)[7]	**48**
	Night	40	49	54	54	**43**
Receivers R27-R30	Day	55	50	63	54	**58**
	Evening	45	48	59	53	**48**
	Night	40	45	55	50	**43**
Commercial	When in use	60	-	-	-	**63**

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

Note 2 Project Amenity Noise Levels corresponding to "Suburban" areas, equivalent to the Recommended Amenity Noise Levels minus 5 dBA.

Note 3 LA90 Background Noise or Rating Background Level.

Note 4 The LAeq is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound

Note 5 According to Section 2.2 of the NSW NPI, the LAeq, 15 minutes is equal to the LAeq, period + 3 dB.

Note 6 Project Noise Trigger Levels are shown in bold.

Note 7 As per Section 2.3 of the NPfI the evening PTNL must not be set greater than the daytime period, as such the PTNL for the evening is to be set as the daytime noise level.

In addition, a maximum noise level criterion as outlined below during the night period (10:00pm to 7:00am) at residential receivers also applies:

vi. NSW Liquor & Gaming Typical Acoustic Requirements

Section 79 of the Liquor Act 2007 provides mechanisms for complaints to be made when `the amenity of local areas is disturbed by the use of licensed premises and registered clubs (including disturbances caused by patrons). These complaints are addressed by the Director of Liquor and Gaming, and in this process they may impose temporary or permanent noise conditions on the licensed venue. Typical noise conditions that are imposed upon licensed premises are as follows:

> *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.*

This is a minimum standard. In some instances the Director may specify a time earlier than midnight in respect of the above condition.

Interior noise levels which still exceed safe hearing levels are in no way supported or condoned by the Director.

Note: NSW Liquor and Gaming criteria does not contain any requirements for commercial or industrial receivers. Noise impacts to these receivers will adopt the broadband criteria outlined in the NSW EPA NPI 2017, see above.

These criteria are applicable to noise emissions from the licensed venue component of the development, excluding noise from mechanical services. For external noise emissions, octave band spectral criteria for each assessment period have been summarised in Table 11 below.

Table 11 Liquor & Gaming NSW – L_{A10} Criteria (external) – Residential Criteria Only

Time Period	Parameter [1]	Octave Band Centre Frequency, Hz									Overall dBA
		31.5	63	125	250	500	1k	2k	4k	8k	
7:00am to 6:00pm	**Receiver R01-R06**										
(Background + 5dBA)	Measured L_{A90} Noise Level	58	51	54	52	47	45	42	35	25	**51**
	Criteria L_{A10}	63	56	59	57	52	50	47	40	30	**56**
	Receiver R07-R26										
	Measured L_{A90} Noise Level	62	55	58	56	51	49	46	39	29	**55**
	Criteria L_{A10}	67	60	63	61	56	54	51	44	34	**60**
	Receiver R27-R30										
	Measured L_{A90} Noise Level	57	55	51	47	47	45	41	32	20	**50**
	Criteria L_{A10}	62	60	56	52	52	50	46	37	25	**55**
6:00pm to 10:00pm	**Receiver R01-R06**										
(Background + 5dBA)	Measured L_{A90} Noise Level	48	42	48	49	44	41	37	31	20	**47**
	Criteria L_{A10}	53	47	53	54	49	46	42	36	25	**52**
	Receiver R07-R26										
	Measured L_{A90} Noise Level	57	51	57	58	53	50	46	40	29	**56**
	Criteria L_{A10}	62	56	62	63	58	55	51	45	34	**61**
	Receiver R27-R30										
	Measured L_{A90} Noise Level	58	57	51	47	46	44	39	28	17	**48**
	Criteria L_{A10}	63	62	56	52	51	49	44	33	22	**53**
	Receiver R01-R06										

10:00pm to 12:00am (midnight)	Measured Noise Level	L_{A90}	45	41	46	45	40	38	35	28	19	**43**
	Criteria L_{A10}		50	46	51	50	45	43	40	33	24	**48**
(Background + 5dBA)	**Receiver R07-R26**											
	Measured Noise Level	L_{A90}	51	47	52	51	46	44	41	34	25	**49**
	Criteria L_{A10}		56	52	57	56	51	49	46	39	30	**54**
	Receiver R27-R30											
	Measured Noise Level	L_{A90}	60	52	47	44	42	40	36	29	22	**45**
	Criteria L_{A10}		65	57	52	49	47	45	41	34	27	**50**
12:00am (Midnight) to 1:00am)	**Receiver R01-R06**											
	Measured Noise Level	L_{A90}	45	41	46	45	40	38	35	28	19	**43**
(Background + 0dBA)	Criteria L_{A10}		45	41	46	45	40	38	35	28	19	**43**
	Receiver R07-R26											
	Measured Noise Level	L_{A90}	51	47	52	51	46	44	41	34	25	**49**
	Criteria L_{A10}		51	47	52	51	46	44	41	34	25	**49**
	Receiver R27-R30											
	Measured Noise Level	L_{A90}	60	52	47	44	42	40	36	29	22	**45**
	Criteria L_{A10}		60	52	47	44	42	40	36	29	22	**45**

vii.NSW EPA (Formerly DECCW) NSW Road Noise Policy (RNP) 2011

(Assessment of Vehicles on Public Roads)

For existing residences and other sensitive land uses affected by additional traffic on existing roads, the NSW Road Noise Policy states that for noise associated with increased road traffic generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB during both day and night-time periods. An increase of 2 dB represents a minor impact that is considered barely perceptible to the average person.