

**2A/ 2-6 CONWAY AVENUE, 38-40 CARLISLE
STREET & 15 - 15 A FERNLEIGH, ROSE BAY
ACOUSTIC REPORT
FOR
TWO CONWAY**



West & Associates

P T Y L T D

Prepared by:

ABN 12 003 731 851
*Building Services and
Acoustic Engineers
Suite A, 39 Smith Ave.
ALLAMBIE NSW 2100
Ph: (02) 9905 3733
Mobile: 0403 994 595
Email: joel.west@waapl.com.au
Web: www.waapl.com.au*

Document Details

Detail	Reference
Project Title	2A/ 2-6 Conway Avenue, 38-40 Carlisle Street & 15 - 15 A Fernleigh, Rose Bay
Job Reference	2298/5
File Reference	26131
Prepared For	TWO CONWAY
Address	2A/ 2-6 Conway Avenue, 38-40 Carlisle Street & 15 - 15 A Fernleigh, Rose Bay
Attention	
Email	[]

Document Control

Revision	Date	Prepared	Checked	Authorized
Issue A	08 December 2025	Joel West	Warwick West	Warwick West
Issue B	17 December 2025	Joel West	Warwick West	Warwick West
Issue C	15 April 2026	Joel West	Warwick West	Warwick West

Warwick West; *W West.*

Director West & Associates Pty. Ltd. ,MIEAust, CPEng, NER APEA Engineer IntPE Aust, BE, Grad. Dip. Arch. Acou. UNSW MAAS, Reg Engineer Dept FairTrading;2025 & 3278,

Joel West; *Joel West*

Director West & Associates Pty. Ltd. ,AffilM IEAust, Grad. Dip. Eng

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**2A/ 2-6 CONWAY AVENUE, 38-40 CARLISLE STREET & 15 - 15 A
FERNLEIGH, ROSE BAY
ACOUSTIC REPORT
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TWO CONWAY**

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APPENDIX 1
APPENDIX 2

PLOT OF BACKGROUND NOISE, FRONT OF SITE
GEOTECH REPORT

**2A/ 2-6 CONWAY AVENUE, 38-40 CARLISLE STREET & 15 - 15 A
FERNLEIGH, ROSE BAY
ACOUSTIC REPORT
FOR
TWO CONWAY**

CONSULTANT DECLARATION

PROJECT DETAILS	
PROJECT NAME	
Application number	TBC By Developers
Address of subject land	2A/ 2-6 CONWAY AVENUE & 38-40 CARLISLE STREET, ROSE BAY
Lot / DP	DP303984, DP 303984, DP 81375, DP 1201196, DP 73175, DP 74055, Lot 1,2 &3 of DP 1201196
APPLICANT DETAILS	
Applicant name	Two Conway Pty Ltd c/- Mathieson Property
Applicant address	L12, 25 Bligh St Sydney NSW 2000
REPORT DETAILS	
Name of report this declaration relates	Acoustic Report
Report reference no.	26131
Report date	15 April 2026
Company name (inc. ABN / ACN)	12 003 731 851
Author name	Joel West & Warwick West
Author qualifications	Joel West: AffilM IEAust, Grad. Dip. Eng. Warwick West: MIEAust, CPEng, NER APEA Engineer IntPE Aust, BE, Grad. Dip. Arch. Acou. UNSW MAAS, Reg Engineer Dept FairTrading;2025 & 3278,
Author address	39 Smith Ave, Allambie Heights
DECLARATION BY CONSULTANT	
Name	Warwick West
Registration no.	2210

Acoustic Report

Residential

2A/ 2-6 Conway Avenue, 38-40 Carlisle Street & 15-15A Fernleigh, Rose Bay

PROJECT DETAILS

Organisation
registered with

AAS

Declaration

The undersigned declares that 25474:

- has been prepared in accordance with the following policy, guidelines, or legislative requirements:
 - Environmental Protection Agency (EPA) published the Interim Construction Noise Guideline 2009
 - AS 2436; 2010- 'Guide to noise and vibration control on construction, demolition and maintenance sites'
 - Noise Guide for Local Government 2010;
 - DECC&W (EPA) publication "Assessing Vibration-a technical guideline" -2006
 - Mosman City Council DCP
 - Noise Policy For Industry 2017
 - AS 2107, 2016, titled 'Acoustics, Recommended design sound levels and reverberation times for building interiors'
 - NCC/BCA 2022
- contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the acoustic report relates;
- does not contain information that is false or misleading;
- identifies and addresses the relevant Planning Secretary's environmental assessment requirements (SEARs) for the project;
- identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments to which the acoustic report relates;
- contains a consolidated summary of the proposed or necessary mitigation measures

Signature



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1.EXECITIVE SUMMARY

Based on our assessments we believe the site can easily achieve acoustic compliance with all relative standards and regulations. Due to the overall quiet nature of the area there are no acoustic requirements or recommendations for the architectural structure.

From our review we can confirm that no mechanical supply of outside air is required and glazing requirements can be met with standard 6.38Lam glass.

We do note that during the CC stage specific attention must be paid to the mechanical ventilation system to ensure compliance with RBL+5dB(A).

Due to the construction being carried out on site by Sydney Water which included plumbing and road works we recommend that relogging is carried out to verify results post construction.

For the purpose of this report we have used the results per the measurement period as carried out for a typical report.

We recommend that during the CC stage logging is carried out in which a simple statement can be made stating any difference within the results if present and corresponding changes to the report where applicable.

Based on our assessments carried out within this acoustic report we expect the development of this project to be able to be suitably built in a method that is in full compliance with the criteria set out by the following codes and regulations;

- AS 2436; 2010- 'Guide to noise and vibration control on construction, demolition and maintenance sites'
- Environmental Protection Agency (EPA) Interim Construction Noise Guideline 2009
- Noise Guide to Local Government
- Noise Policy for Industry 2017
- North Sydney Council DCP
- SEARS guideline

2.PROJECT DESCRIPTION

2.1.REPORT TO SUPPORT DEVELOPMENT

This acoustic report has been prepared by West & Associates Pty Ltd on behalf of Two Conway to assess the potential environmental impacts that could arise from the construction of a housing development. This report supports the assessment of the proposed development under Part 4 of the *Environmental Planning and Assessment Act 1979*.

This report has been prepared to assess the site for the use as a residential development and its acoustic impacts on the surrounding area including the acoustic impact onto the proposed development.

The report is aimed at addressing noise from the district and noise created at site by occupant use and mechanical services plant at the closest sensitive receiver locations.

In addition to the above the scope of work is to document a Demolition, Excavation & Construction Noise & Vibration Management Plan (**Noise & Vibration Management Plan**) for the proposed works at site as required by the Client.

This report has been prepared as a noise management tool identifying and discussing the following:

- a) Background and Description of site and works and the identification of sensitive receivers
- b) Identification of activities being carried out and predict level of construction noise & vibration
- c) Determine Noise and Vibration Criteria
- d) Noise & vibration monitoring method to be used during construction, reporting and response
- e) Assessment of construction noise and vibration levels during construction and predict impact on sensitive receivers
- f) Mitigation deployed to reduce impact
- g) Construction Management Plan including timetable, respite periods and frequency
- h) Community consulting
- i) Contingency Plan to record complaints, assessment of non compliance and register to record complaints and remedial action taken

This report is for the exclusive use of our Client. No warranties are expressed or inferred to third parties. No part of this report shall be relied upon by other parties without the written permission of West and Associates Pty Ltd.

West and Associates Pty Ltd disclaim all responsibility to the Client and others for matters outside the agreed scope of work.

2.2. SEARS REPORTING

Item	SEARS Requirement	Relevant Section of Report
10.0	Noise and Vibration	
	Provide a noise and vibration impact assessment prepared in accordance with the relevant NSW Environment Protection Authority (EPA) guidelines. The assessment must detail construction and operational noise and vibration impacts on nearby sensitive receivers and structures and outline the proposed management	8. DEMOLITION & CONSTRUCTION NOISE ASSESSMENT (DEMOLITION & CONSTRUCTION NOISE MANAGEMENT PLAN)

2.3.REFERENCE DOCUMENTATION

The report is based on the details given in the following set of documents:

1. MHNDUNION Architectural Drawings, Project 2A/ 2-6 Conway Avenue & 38-40 Carlisle Street, Rose Bay Dated: 17 December 2025
2. Geotech Report prepared by Ei Australia E26891.G03 Dated 25/11/25

2.4.DESCRPTION OF THE SITE

The proposed site consists of multiple residential properties to be fully demolished and the site to be reused fully for the proposed works.

The existing front of the site is shown in the photo below.



Photo of site; 2A/ 2-6 CONWAY AVENUE & 38-40 CARLISLE STREET, ROSE BAY

The existing site and surrounding area can be seen in the Google Aerial Photo below:



Google Aerial Photograph,

2.5. CLOSEST SENSITIVE RECEIVERS

The site currently sits in a predominately residential with surrounding residential properties in the area. The closest residential sensitive receivers have been identified below and shown on the Google aerial photo above.

The neighbouring closest sensitive receiver has been identified below:

- Location #1, Existing Residential Receiver – 6 Chamberlain Ave
- Location #2, Existing Residential Receiver – 1 Chamberlain Ave
- Location #3, Existing Residential Receiver – 45-59 Carlisle St
- Location #4, Existing Residential Receiver – 34A Carlisle St to 3 Conway Ave
- Location #5, Existing Residential Receiver – 8 Conway Ave

2.6. DISTRICT BACKGROUND NOISE

District background noise in the immediate location of the proposed site is dominated by road traffic noise from Carlisle Street. During monitoring various road works were being carried out by Sydney Water along Carlisle St which included plumbing and various degrees of road works & excavation. During the monitoring period construction work was also being carried

out at 8 Conway Ave. Due to this the day period measurements are potentially carried out not in accordance with the Noise Policy for Industry, however we do believe evening and night time measurements would be compliant.

2.7. TRAFFIC NOISE AT PROJECT LOCATON

The dominant traffic background noise source for this project is road traffic noise from Carlisle Street.

2.8. COMMERCIAL AREA NOISE AT PROJECT LOCATION

The site is located in a predominantly residential area with no immediate adjacent commercial properties.

2.9. PROPOSED HOURS OF OPERATION

As the project consists of residential properties the proposed hours of operation would be 24/7.

3. NOISE CRITERIA

3.1. WOOLLAHRA MUNICIPAL COUNCIL DCP

In Woollahra, the main planning rules applying to residential flat buildings, shop top housing and mixed use development with a residential component are set down in:

- [The Environmental Planning and Assessment Act 1979](#)
- [The Environmental Planning and Assessment Regulation 2021](#)
- State environmental planning policies, particularly [SEPP No 65 Design Quality of Residential Apartment Development](#)
- [Apartment Design Guide](#) published by the NSW Department of Planning and Environment, June 2015
- [Woollahra LEP 2014](#)
- [Woollahra DCP 2015](#)

B3.5.4 of the DCP states the following;

Acoustic privacy The level of acoustic privacy depends upon the location of habitable rooms relative to noise sources such as habitable rooms, decks, terraces, driveways, air conditioning units, swimming pool pumps and major roads.

Dwellings are designed to ensure adequate acoustic separation and privacy to the occupants of all dwellings.

This may be achieved by:

- ensuring that bedrooms of one dwelling do not share walls with the habitable rooms (excluding bedrooms) or parking areas of the adjacent dwelling;
- locating bedroom windows at least 3m from streets, shared driveways and parking areas of other dwellings; and
- separating bedrooms, by way of barriers or distance, from on-site noise sources such as active recreation areas, car parking area, vehicle accessways and service equipment areas.

3.2. NOISE POLICY FOR INDUSTRY

The Noise Policy For Industry 2017 documents the requirements for determining the Noise Trigger Level and Sleep Disturbance.

3.3.CODE AS2107

Both the recommended indoor mechanical services sound levels and recommended internal criteria for traffic noise is nominated in the code AS 2107, 2016, titled 'Acoustics, Recommended design sound levels and reverberation times for building interiors' which is used for the areas not covered by the City's DCP as set out in the Table below:

Table 1; Recommended internal design sound levels L_{Aeq} -dB(A)

	AS 2107 Satisfactory ①	AS 2107 Maximum ②	Selected Req. ③
- Bedrooms	30 dB(A)	40 dB(A)	35 ③
- Living Areas	35 dB(A)	45 dB(A)	40 ③
- Toilets & Bathrooms, Hallways	45	55	55
- Car park	55	65	65

① AS 2107 Satisfactory; regarded as appropriate in areas of major roads

② AS 2107 Maximum; regarded as level where most people become dissatisfied

③ DCP Controls 35 dB(A) @ 1 Hour reputable maximum for the night period with windows closed

3.4.COMPLIANCE WITH THE BUILDING CODE OF AUSTRALIA

Compliance with the Building Code of Australia (BCA) is a statutory requirements of new residential multi occupancy buildings. F7 of the BCA/NCC 2025 titled details the "Sound Transmission and Insulation Requirements" for residential developments. Specifically addressing separating walls and floors.

The acoustic criteria for the internal walls are stated within the BCA and are listed below:

- 50 Rw+Ctr for a wall separating Sole Occupancies (Discontinuous construction required)
- 50 Rw for a wall separating Sole Occupancy with a plant room, lift shaft, stairway, public corridor, public lobby, or parts of a different classification (Discontinuous construction not required)
- 40 Rw+Ctr for a services shaft wall if adjacent to a habitable room
- 25 Rw+ Ctr for a services shaft wall if adjacent to a kitchen or non-habitable room

3.5.DEMOLITION & CONSTRUCTION NOISE CRITERIA FOR SITE

3.5.1.Compliance with the Code AS 2436-2010

The code AS 2436; 2010- 'Guide to noise and vibration control on construction, demolition and maintenance sites' (AS 2436) provides lists of typical demolition and excavation equipment noise, the details how noise and vibration can be offensive, suggests methods to better manage and reduce site and noise and predicted noise levels from the various Appliances. Appendix 1 of this code provides noise levels of some common construction plant used on sites. However, this code does not provide a noise or vibration level criteria.

3.5.2.EPA's Noise Affected Criteria

The Environmental Protection Agency (EPA) published the Interim Construction Noise Guideline 2009 is a guide to the construction industry as a tool for the management of construction noise, suitable to be used with NSW Government Construction projects and suitable to be used by local governments.

This document is based on background noise levels for the area and discusses work times when certain Construction Appliances can be used, feasible and reasonable mitigation measures, the adoption of rest periods when appropriate, and addresses management for noise at residences.

The EPA's Interim Construction Noise Guidelines addresses two Management Levels which consist of Noise Affected and Highly Noise Affected as follows:

- The Noise Affected criteria is assessed as the background (or rating background Level RBL) +20dB for projects of 0 to 4 weeks
- The Noise Affected criteria is assessed as the RBL +10dB for projects of 5 to 26 weeks
- The Noise Affected criteria is assessed as the RBL +5dB for projects greater than 26 weeks or outside recommended standard hours
- The Highly Noise Affected criteria is taken as 75 dB(A) which is the level where there may be strong community reaction to noise.

This project should be complete within the 26+ week period so the Noise Affected criteria is taken as RBL +5dB.

3.5.3.Noise Guide For Local Government -Offensive Noise

The Noise Guide for Local Government 2010; **(NG)** provides details on how specific noise levels can be determined so as not to cause offense to the closest sensitive receivers.

The NG publication describes factors that come into play when a noise created in a local area can be regarded by the receiver as being offensive. Nature and characteristics they list in their publication to be considered **inside** a closest sensitive receiver are as follows:

- Location of noise, loudness of the noise especially
- The character of the noise compared with other noises in the area
- The time and duration of the noise
- Whether the noise is typical of the area
- How often the noise occurs
- The number of people that are affected by the noise

The NG publication states the following in Clause 2.1.2 :

"audibility in a neighbouring residence is used to determine whether noise from a certain activity that often results in neighbourhood complaints is offensive".

The NG publication requires background noise levels for assessment purposes to be determined by a sound level meter as a $L_{A90\ t=15\ min}$ descriptor for the appropriate time of the day. The NG cross references the Industrial Noise Policy which defines how single value background noise can be determined for the 3 periods of the day called the Rating Background Level (RBL), being the daily medium of the lower 1/10 percentile of the $L_{A90\ t=15\ min}$ background noise for each period

The NG publication recommend that in most cases the level of noise impact be measured as a $L_{AEq\ t=15\ min}$ descriptor.

The NG states that offense is to be assessed inside a sensitive receivers location, ie. Indoors. Industry practice accepts there is 10 dB attenuation of noise entering an open window.

Combining these NG recommendations, the Project Specific Noise Level is to be based on the Intrusiveness Criteria. The noise level being heard inside the closest sensitive receivers is determined by using the typical appliance noise levels as given in Table 1 above (derived from AS 2436) and calculating the attenuation from the distance from site, by any sound barriers created by separating fences or building structure and attenuated by 10 dB through an open window.

3.5.4.Vibration From Excavation & Construction

DECC&W (EPA) publication "Assessing Vibration-a technical guideline" -2006. Recommends the vibration levels given in the code BS 6472-1 2008 "Evaluation of Human exposure to vibration in buildings" (updated from the previous 1992 edition) is to be adopted.

The code BS 6472:2008 requires that either ground acceleration be monitored in the 3 directions or the maximum combined particle velocity of the three directions be monitored. The code gives the conversion between these two alternatives. The code gives the method by which the monitored results can be converted into Vibration Dose Values($\text{m/s}^{1.75}$). The Code then list the level of Vibration Dose that bring certain probable reactions from occupants. These values are as shown in the following Table.

Table 2: Vibration Dose Values($\text{m/s}^{1.75}$) (from ABS6472-2008, Table 1)

Place	Low Probability of adverse comment ($\text{m/s}^{1.75}$)	Adverse comment possible ($\text{m/s}^{1.75}$)	Adverse comment probable ($\text{m/s}^{1.75}$)
Residential Building Day (16 Hrs)	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential Building Night (8 Hrs)	0.13	0.26	0.51

The threshold of perception of vibration is 0.015 m.s^{-2} which corresponds to a peak particle velocity of 0.5 m.s^{-1} .

Therefore the accumulated x, y & z vibration criteria of **0.5 metres per second velocity** be adopted as the vibration criteria for site.

4.NOISE MEASUREMENTS

4.1.RECOMMENDATION OF RE-LOGGING

As addressed within the background noise section the day period during our monitoring period contained NSW State road works which we expect is likely to affect the day period measurements. We believe that the information is sufficient enough to complete this issue of the acoustic report for initial review.

As the day period is technically non compliant with the Noise Policy for Industry 2019 requirements for logging we recommend that as a Condition of Consent acoustic monitoring must be repeated for the site during the CC stage to verify background noise measurements and findings.

4.2.DISTRICT BACKGROUND NOISE MONITORING LOCATION AND TIME

The fifteen minute continuous L_{Aeq} , L_{A90} , and L_{A1} descriptor background noise monitoring was carried out at 5 meters above ground level at the monitoring location 1 between 10:45 31/10/2025 and 9:30, 07/11/2025 located at the front of the proposed site.

The log of the results of background noise monitoring for the roof are shown in Appendix 1. Raw data is available upon request.

4.2.1.Monitoring Instrumentation

Noise measurement instrumentation used to log continuous district background noise in this report is an ARL, Model EL 316 (Type 1) environmental noise logger Serial No. 16-203-500. Attended site analysis of district noise was taken using a SVAN 945A sound analyser, Serial No 9418. Field calibration checks for the instruments were carried out using a Acoustic Calibrator Type Rion NC 73 Serial No. 11127967. All instruments hold current NATA calibration certificates and measurement instruments are in accordance with the requirements of AS 1259.2, Sound Level Metres, Integrating Averaging.

4.2.2.Monitoring, Calibration and Calculation Procedures

In accordance with the procedures laid out in AS 1055.1 field calibration check of the environmental noise logger was carried out immediately prior to and at completion of monitoring sessions and instrument was found to be within the specified limits.

A microphone wind-guard was in place for the full duration of the monitoring and so no correction factor required.

The 15 minute L_{Aeq} and L_{A90} , log results were down loaded and single figure L_{A90} representative values calculated using Microsoft Excel software in accordance with the procedures given in the INP for the day(7AM to 6 PM), the evening period, (6 PM to 10 PM) and the night time period, (10PM to 7 AM) and single figure L_{Aeq} over the days monitored. The Repeatable Maximum L_{Aeq} (1 Hour) day and evening log results were calculated between 6 AM to 10 PM and night log results between 10 PM and 6 AM

4.2.3.Environmental Conditions During Monitoring

Temperatures on site were between 10 to 30°C for the logging period.

Wind Speed at was monitored at Sydney Airport. The results of the log indicated that at no time during the logging period did the local wind speed exceed the maximum level of 5 M/S. Metrological data including temperature, barometric pressure, wind speed at site were not outside the recommendations of AS 1055 and INP and so the L_{A90} and L_{Aeq} measurements are considered valid

The resulting L_{A90} log averages over the period monitored was then used to determine the Intrusiveness Criteria. The resulting L_{Aeq} log averages over the period monitored was then calculated and used to determine the Amenity Criteria. The Project Specific Noise Level for the site was determined as the lesser of the Intrusiveness and Amenity Criteria.

4.2.4.Logger Settings

The settings of the environmental noise logger is shown in the Table below:

Table 3; Noise Logger Settings

Acoustic Research Laboratories Pty Ltd - Type 1 Environmental Noise Logger	Logger Settings
Frequency Weighting	A
Time Averaging	Fast

Statistical Interval	15 minute
Pre-measurement Reference	94
Post-measurement Reference	94
Engineering Units	dB SPL

4.3.BACKGROUND NOISE RESULTS

4.3.1.Background Noise Single Figure Results

Analysis of the 15 minute L_{A90} and L_{Aeq} results were carried out using Microsoft EXCEL according to the requirements of the INP and the single figure RBL and the site noise from road traffic results for each period are shown in the table below:

Table 4; Single Figure RBL's and Site Noise for Project

NOISE DETAILS/Period times	Day (0700 to 1800)	Evening (1800 to 2200)	Night (2200 to 0700)
Location 1 RBL L_{A90} 15 min	40.5	37.4	30.9
Location 1 L_{eq} 15 min period log average Noise	59.7	47.8	44.5

Table 5: Summary of Traffic Noise For Each Facade

Road Traffic Noise Monitored L_{Aeq} , -	Day L_{Aeq} , T=15hr	Night L_{Aeq} , T=9hr
Road Traffic Noise East Facade L_{Aeq} ,	57.0	44.5

4.3.2.Construction Noise Affected Criteria

The construction works shall be carried out within in the day period (7 AM -6 PM) only so no after hours construction criteria need be determined.

Noise Affected Criteria as recommended by the EPA's Interim Construction Noise Guideline for the standard construction hours is therefore $41+5=46$ dB(A)

5.NOISE POLICY FOR INDUSTRY

5.1.EXTERNAL NOISE LEVEL DETERMINATION IN ACCORDANCE WITH NOISE POLICY FOR INDUSTRY 2017 - NOISE TRIGGER LEVEL

5.1.1.Single Figure Results

The Noise Policy for Industry 2017(NPFI) requires:

- Intrusiveness Criteria be determined by calculating the Rated Background Levels (RBL) over the days monitored. We used the 5 days of 15 minute noise logging at site found in Appendix 1 to determine the background, the L_{A90} background noise logged result reflected a reliable background level. Being measured adjacent to Closest Sensitive Receiver #1.
- The Project Trigger Noise Level or external noise criteria for the project is determined as the lesser of the Intrusiveness and Amenity Criteria for the site for each period of the day.

Table 6; Noise Monitoring Results - Location 1

Period times	Day (0700 to 1800)	Evening (1800 to 2200)	Night (2200 to 0700)
Location RBL LA90 15 min- ^①	40.5	37.4	30.9
Location Intrusiveness Criteria LAeq 15 min RBL + 5	46	42	36
Project Amenity Noise Level at Closest Sensitive receivers LAeq 15 min, (SubUrban Table 2.2 NPFI)	55	45	40
Selected Project Trigger Level	55	45	40
Project Trigger adjacent to closest residence	55	45	40
LAeq 15 min, day period Local Road Traffic	55-5+3=53 ^②	45-5+3=43 ^②	40-5+3=38 ^②
Industrial Noise Trigger Level(PSNL) LAeq 15 min =stricter of Intrusiveness and Amenity Criteria R	46	42	36

^① RBL at Boundary LA90 T=15 min from Appendix 1 results

^② Site Noise, Additional 3 dB added to LAeq T=15 min measured value from Appendix 1 results

5.1.2. Project Trigger Noise Level for this Project

The PTNL for the front of site based on unattended noise logging over the period is therefore taken as **46 dB(A)** in the day period, **42 dB(A)** in the evening period and **36 dB(A)** in the night period which are required to be measured as a LAeq, t=15 min descriptor.

We note that assessing the PTNL for this project under the full 7 day logging or the shorter 5 day period has zero implication of the final determined PTNL.

6.DETERMINATION OF CONSTRUCTION REQUIREMENTS

6.1.CALCULATIONS OF BUILDING ATTENUATION WORKS USING AS 3671

The calculation method to determine the attenuation of facade elements is given in AS 3671; 1989 which uses the 9 hour log average for the night period.

Code AS 3671 defines Road Traffic Noise Reduction(TNR) as the difference between the appropriate LAeq, T monitored and the appropriate internal or "receiving" room background level LArec and values for this site are shown in the Table below:

Table 7; Noise Reduction Determination LAeq-dB(A)

Face, Location & Use of Space in the Building	LAeq, T ^①	LArec ^②	TNR (①-②)	Construction Category ^③
All bedroom Facades	45 dB(A)	35 dB(A)	10	Category 1
All habitable facades	45 dB(A)	40dB(A)	5	Category 1

^① Night period 1Hr LAeq value

^② Recommended internal level from DCP

^③ Construction 1, 2, & 3 Categories defined in AS 3671 as, Category 1 is TRN=< 10, Category 2 is TRN>10, <=25 and Category 3 TNR >25, <=35, Category 4 > 36

6.2.EXTERNAL BUILDING DESIGN REQUIREMENTS

Using the above Traffic Noise Reduction figures we have calculated the R_w requirements for construction on each facade including window requirements.

Table 8; Calculated Traffic Noise Wall Attenuation for each Facade

Face, Location all levels & Use of Space in the Building	TNR	TNAc Requirement	R_w equivalent
All bedroom Facades	10	11	14
All habitable facades	5	6	10

Table 9; Calculated Window & Sliding Door Attenuation

Face, Location all levels & Use of Space in the Building	TNR	TNAc Requirement	R_w equivalent
All bedroom Facades	10	13	17
All habitable facades	5	8	12

Using the above calculated required attenuation figures we have nominated possible complying construction combinations.

We note that the below combinations have been prepared as an example and the project is not required to use the exact nominated combinations. The only criteria for construction combinations is the calculated R_w attenuation addressed above. Different manufacturers will have different frame systems which may result in varying attenuation levels. It is important that all attributes of the glazing system be incorporated into the final installed product such as;

- Appropriate framing to achieve required attenuation
- Appropriate level of glass thickness
- Appropriate sealing of glazing joins such as rubber seals
- Appropriate sealing around the frame of the window

Table 10; Example Complying Combinations AWS WHITEPAPER ACOUSTIC DETAILS

Item	Combination	Combination Attenuation	Required Attenuation
Fixed Glazing	6.38mm Lam Glass in frame.	32Rw	12-17Rw
Awning Windows	6.38mm Lam Glass in frame. (ATF1211)	34Rw	12-17Rw
Sliding Windows	6.38mm Lam Glass in frame. (ATF813)	32Rw	12-17Rw
Sliding Door	6.38mm Lam Glass in frame. (ATF792)	30Rw	12-17Rw
Roof	CSR 6402	41Rw	14Rw

We recommend that during the construction stage our acoustic report is provided to the window manufacturer to ensure that the installed products meet the calculated attenuation.

6.3. VENTILATION TO BEDROOMS AND HABITABLE

We have used the 9hr log average for the night period being 45dB(A) to determine applicable internal noise levels. From our calculations applying distance from site of measurement and 10Rw for an open window we have determined that the internal noise levels will comply with 35dB(A) per AS2107. Therefore, no requirement for mechanical supply of outside air is required and the building can be naturally ventilated.

7. NOISE FROM PROPOSED DEVELOPMENT

7.1. SOURCES OF NOISE FROM SITE

7.1.1. Mechanical Services Noise

Mechanical Services that may be generated at site will include the following:

- Mechanical ventilation for underground ground park & services rooms
- Air Conditioning with outdoor air /ventilation
- Unit ventilation

7.1.2. Vehicle Noise

As the site contains a car park we would expect some vehicle noise present on site as residents arrive and leave. We note that cars entering and leaving the driveway will have to drive slower than typical traffic for the area and thus would create less noise than existing cars using the street.

7.1.3. Private Open Space

The architectural plans show various private open spaces such as the following;

- Private open spaces with pool on ground floor
- Balconies for each lot
- Roof top pool

7.1.4. Communal Open Space

The architectural plans show various communal open spaces such as the following;

- Lower Ground floor external communal open space
- Roof communal open space

7.2. MECHANICAL SERVICES NOISE LEVELS

7.2.1. Internal Noise levels from Building Plant

The DA drawings do not include any details of the proposed mechanical Services proposed to be installed. Therefore the internal noise levels produced by the mechanical services plant on site that includes the bathroom exhaust fans, air conditioning units /ventilation fans shall comply with the levels given for the nominated spaces as listed in Table 1.

7.2.2. External Noise levels from Building Plant

The DA drawings do not include any details of the proposed Mechanical Services proposed to be installed. Therefore the external noise levels produced by the mechanical services plant on site that includes the bathroom exhaust fans, air conditioning units /ventilation fans shall comply with the RBL+5dB requirement for the building during the day and evening period and not audible inside closest sensitive receivers during the night period.

We have carried out a preliminary review of the proposed ACC layout. A detailed assessment cannot be carried out at this stage as make and model numbers have not been confirmed. However, from what we can tell the site consists of dedicated ACC per lot, due to this it would likely be a VRV system of up to 20kW.

For the purpose of this report we have nominated a Daikin RSUYQ7AYM with a noise level of 61dB(A)@1m, with a cumulative impact of all equipment operating maxing out at 71dB(A)@1m applying the noise adding rule.

Calculating this at a distance including the acoustic screening on site we have determined at the closest sensitive receiver that the calculated noise level is ~32dB(A).

This noise level is in full compliance with all project trigger noise levels and would be expected to be ~20dB(A) inside the closest sensitive receiver being full compliance with standard non audible inside at night time criteria.

We note that a more detailed assessment should be carried out once the design is completed.

7.3.VEHICLE NOISE

7.3.1.Vehicle Noise Generally

The premises will have vehicles arriving and leaving the site however as the vehicles have to travel slower than general traffic in the area to enter and leave the drive way the expected vehicle noise is not to exceed existing background noise levels.

Due to the location of the driveway we believe minimal to no canyon effect would be applicable to rising noise. This is due to overhang above the driveway.

7.3.2.Vehicle Noise At Closest Sensitive Receivers

In order to assess the impact vehicle noise will have on closest sensitive receivers we have carried out the following assessment. We note that our assessment is predominantly based on overall distance from the driveway to neighbouring properties. As the cars entering and leaving site have to drive slower than other vehicles the noise generated by site specifically would be typically less than local traffic.

Table 11: Summary of Vehicle Noise Intrusion for surrounding properties

Noise Source	Closest Sensitive Receiver	Noise Level	Noise Level at Closest Sensitive Receiver	PSNL Day/ Evening/ Night	Compliance
2 Car's moving slowly	Receiver 1	48.8dB(A) @ 2m	<35dB(A)	46 / 42 / 36 dB(A)	Yes/Yes/Yes
2 Car's moving slowly	Receiver 2	48.8dB(A) @ 2m	<35dB(A)	46 / 42 / 36 dB(A)	Yes/Yes/Yes
2 Car's moving slowly	Internal receiver - Inside	48.8dB(A) @ 2m	<35dB(A)	35 dB(A)	Yes

7.4.PRIVATE OPEN SPACE

7.4.1.Private Open Space Noise Spectrum

This has been based off general conversation noise of limited amount of people.

We have separated the type of use based on typical day use which tends to be louder compared to night time use when people are generally quieter.

The noise spectrum of the private open space noise has been included within the table below:

Table 12: Noise Level Spectrum

	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	dB(A)
Private Open Space – Day Use	48	56	53	52	51	48	43	39	55 @ 2M
Private Open Space – Night Use	38	46	43	42	41	38	33	29	45 @ 2M

7.4.2.Private Open Space Noise On Closest Sensitive Receivers

Based on the above acoustic model and parameters given, we have calculated the resulting sound pressure levels at each of these closest affected residences & have listed the relevant criteria as shown in the table below:

Table 13: Summary of Outside Noise Intrusion for surrounding properties

Source Location	Closest Sensitive Receiver	Noise Level	PSNL	Calculated Noise Level	Compliance with Criteria
Ground Floor Private Spaces Inc Pool – Day Use	Closest Sensitive	55dB(A) @2m	46 / 42 / 36 dB(A)	46dB(A)	Yes / NA / NA
Ground Floor Private Spaces Inc Pool – Day Use	Closest Sensitive	45dB(A) @2m	46 / 42 / 36 dB(A)	37dB(A)	NA / Yes / Yes
Level 1-7 Private Spaces – Day Use	Closest Sensitive	55dB(A) @2m	46 / 42 / 36 dB(A)	42dB(A)	Yes / Yes / NA
Level 1-7 Private Spaces – Night Use	Closest Sensitive	45dB(A) @2m	46 / 42 / 36 dB(A)	32dB(A)	NA / NA / Yes

Level 7 Private Space Inc Pool – Day Use	Closest Sensitive	55dB(A) @2m	46 / 42 / 36 dB(A)	<42dB(A)	Yes / Yes / NA
Level 7 Private Space Inc Pool – Night Use	Closest Sensitive	45dB(A) @2m	46 / 42 / 36 dB(A)	<32dB(A)	NA / NA / Yes

7.5.COMMUNAL OPEN SPACE

7.5.1.Communal Open Space Noise Spectrum

This has been based off previously measured communal open space noise with approximately 40 people talking.

The noise spectrum of the communal open space noise has been included within the table below:

Table 14: Noise Level Spectrum

	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	dB(A)
Communal Open Space	55	63	60	59	58	55	50	46	62 @ 3M

7.5.2.Communal Open Space Noise On Closest Sensitive Receivers

Based on the above acoustic model and parameters given, we have calculated the resulting sound pressure levels at each of these closest affected residences & have listed the relevant criteria as shown in the table below:

Table 15: Summary of Outside Noise Intrusion for surrounding properties

Source Location	Closest Sensitive Receiver	Noise Level	PSNL	Calculated Noise Level	Compliance with Criteria
Lower Ground COS	Closest Sensitive	62dB(A) @3m	46 / 42 / 36 dB(A)	<35dB(A)	Yes / Yes / Yes
Roof Top COS	Closest Sensitive	62dB(A) @3m	46 / 42 / 36 dB(A)	<35dB(A)	Yes / Yes / Yes

8.DEMOLITION & CONSTRUCTION NOISE ASSESSMENT (DEMOLITION & CONSTRUCTION NOISE MANAGEMENT PLAN)

8.1.SCOPE OF DEMOLISHING & EXCAVATION WORKS

The proposed development involves bulk earthworks of the site, minor excavation for 2-2.5 basement levels to the maximum depth of approximately 9m below ground level. As stated within the Geotech report the majority of this fill would be sand, clay & sandstone.

Based on the expected architectural designs and the Geotech testing we would expect the general excavation to consist of land levelling with minor excavation to approximately 9m below existing ground level. We have assessed the noise produced on site during the site preparation and excavation of the proposed works to be as follows:

- Front end loader shall be used to clear residual sand, mulch to bedrock
- Due to the overall depth of excavation to serve the basement parking major excavation works which may include some rock breaking as Geotech report documents weathered sandstone up to 5m depth defined as very low to medium strength.
- Pier Drilling
- Laying of concrete for area apron

Based on the Geotechnical Log shown within Attachment 2 we have reviewed the materials at the expected depth of excavation.

8.2.CONSTRUCTION STAGES

The detailed construction stages are to be provided by the developer during the appropriate stages.

8.3.CONSTRUCTION HOURS

The detailed construction hours are to be provided by the developer during the appropriate stages however due to the nature of demolition and construction noise we recommend that demolition and external construction hours are limited to the Day period and in accordance with the EPA's guideline.

8.4.CONSTRUCTION TRAFFIC NOISE

We would expect overall construction based traffic noise to consist of work vehicles and heavy vehicles. These types of vehicles are consistent with local traffic around the immediate area and therefore we do not expect them to cause any adverse affects to the overall project trigger noise levels as defined with the Noise Policy for Industry.

8.5.CONSTRUCTION VIBRATION

The Geotech report shows sandstone present in the areas to be excavated for basement car parking. Due to this we would expect some level of vibration from rock breaking and excavating.

8.6.PREDICTED NOISE & VIBRATION LEVELS & IMPACT AT SENSITIVE RECEIVERS

8.6.1.Predicted Appliance Noise Levels

The listing of appliances understood to be required to be used at site, their grouping according to AS 2436 which includes a table giving typical noise level at 10 metres of excavation and construction appliances. The appropriate appliance used on this site and their sound levels are shown in the following table:

Table 16: Predicted Appliance Noise Levels for Project

Appliance Description	dB(A) ave15 min @ 10 M
5 cm Front End Loader	72 dB(A)①

Crane	77 dB(A)❷
Excavator	79 dB(A)❷
Piling	83 dB(A)❷
Concrete Agitator truck	76 dB(A)❷
Concrete pump truck	80 dB(A)❷
Hand Held Electric Jack Hammer	88 dB(A)❶
Hand Held Tools	74 dB(A)❷
20 Ton truck, with or without dog	72 dB(A) @ 7m❶
10 Tonne Excavator with Hammer	90 dB(A) @ 3m❶
10 Tonne Excavator with Rock Saw	85 dB(A) @ 3m❶

❶ Determined from library of previous site measurements

❷ AS 2436-2010; Guide to noise and vibration control on construction, demolition and maintenance sites

8.6.2. Predicted Appliance Vibration Levels

We have assessed the transmission of vibration produced on site at the closest sensitive receivers (who are the immediate adjacent neighbours) and have determined that vibration will be minimal to non existing.

The Geotech report has confirmed at the maximum depth is medium sandstone, due to this to reduce vibration through rock breaking we believe an excavator with a rock saw will be used to cut out sections, predominantly at the boundary to reduce the transfer of vibration.

We therefore predict there will be no source of vibration outside criteria transmitted past the boundary of this site during construction.

8.6.3. Predicted Noise Levels During Construction

Table 1 above lists the predicted sound pressure levels that would be generated by the appliances used during the demolition and construction phases of the project in the centre of the project site.

We have calculated the expected sound pressure (noise) levels of the various demolition and construction equipment that is expected to be used at each of the closest sensitive receiver's internal rooms and the results shown in the following table. We have calculated the exceedance being the predicted noise level minus the Noise Affected Criteria and results also shown in the table below for the closest sensitive receiver. We note that equipment location has been calculated with the location approximately 5-10 meters from boundary edge, as equipment ventures further in the centre of the property the distances to the closest sensitive receivers will be greater which will reduce the predicted noise levels.

Table 17: Predicted Appliance Noise Levels at closest sensitive receivers

Appliance Description	Noise level dB(A) ave15 min @ 10 M	Noise Affected Criteria ③	Predicted dB(A) ave 15 min inside Closest Sensitive Receiver	Exceedance ave 15 min inside #1, #2 Closest Sensitive Receiver
5 cm Front End Loader	72 dB(A)①	46 dB(A)	~58dB(A)	12dB(A)
Crane	77 dB(A)②	46 dB(A)	~55dB(A)	9dB(A)
Excavator	79 dB(A)②	46 dB(A)	~65dB(A)	19dB(A)
Piling	83 dB(A)②	46 dB(A)	~55dB(A)	9dB(A)
Concrete Agitator truck	76 dB(A)②	46 dB(A)	~60dB(A)	14dB(A)
Concrete pump truck	80 dB(A)②	46 dB(A)	~56dB(A)	64dB(A)
Hand Held Electric Jack Hammer	88 dB(A)①	46 dB(A)	~72dB(A)	28dB(A)
Hand Held Tools	74 dB(A)②	46 dB(A)	~62dB(A)	16dB(A)
20 Ton truck, with or without dog	72 dB(A) @ 7m①	46 dB(A)	~57dB(A)	11dB(A)
10 Tonne Excavator with Hammer	90 dB(A) @ 3m①	46 dB(A)	~68dB(A)	22dB(A)
10 Tonne Excavator with Rock Saw	85 dB(A) @ 3m①	46 dB(A)	~63dB(A)	17dB(A)

We note that from the calculated noise levels produce by noisy operations of the demolition, excavation and construction of this project, the Highly Affected limit of 75 dB(A) is not reached inside any closest sensitive receiver.

① *Library of Noise*

② *AS 2436-2010; Guide to noise and vibration control on construction, demolition and maintenance sites*

③ *EPA's Noise Affected Criteria*

8.7.CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN - PROGRAM

The Principal Contractor is recommended to complete the noise management plan that construction program, itemising the start and finish dates of each of the following major building stages. This program need not be the full building program as it is designed to be distributed to the immediate neighbours both beside and behind the site to provide them an idea of how long the noise will continue for each section of work.

8.8.CONSTRUCTION NOISE AND VIBRATION MITIGATION

8.8.1.Resolving Noise & Vibration Complaint Issues

The issue of the Construction Time table should be sufficient to provide the closest adjacent neighbours with an overall feeling and time frame of the project.

The Site recommended to display the following

1. Display a notice at the front of the property details of the following:
 - Builders name, principal address, fixed and mobile phone numbers, hours contactable,
 - Site Supervisor's fixed and mobile phone numbers
2. Instruct the Builder to keep a diary of any contact with neighbours that have raised a noise or vibration complaint
3. The Builder immediately advise the Nominated Council Officer and discuss the issue to attempt to modify onsite construction practices to alleviate the problem.

8.8.2.Unresolved Noise and Vibration Complaint Issues

During the demolition and excavation stage, the resulting noise may exceed the noise criteria for periods and we propose the following strategies and additional respite periods to be applied if there are any non resolved noise complaints from demolition and excavation works at the site. The unresolved noise complaints cut-off point occurs in either of the following two situations:

- When complaints have been received at site, unsuccessful attempts have been made by the Builder to diffuse the complaint, the Builder immediately advise the Nominated Council Officer for direction
- When nominated in writing as a unresolved noise complaints by the Nominated Council Officer for the site, the Nominated Council Officer to request the Acoustic Engineer to prepare a reply along with any recommendations to mitigate the cause of the complaint raised and the Owner and/or the Builder implement the changes to attempt to resolve the objections being raised.

8.8.3.Excavation And Construction Noise Monitoring

Although we do not expect it should a noise complaint be received, we recommend that when the nominated works proceeds, a hand held sound level metre be used to monitor the $L_{Aeq\ t=15\ min}$ descriptor of the source of noise that was described in the complaint outside the residence who made the complaint, typically that would be at the closest sensitive receivers #1, the level measured adjusted by -10 dB(A) to account for attenuation through an open window and this level be compared with the criteria.

If the noise level determined is above the criteria, discuss and come to an agreement with the person making the complaint, suitable mitigation methods that can be employed including changes to work times, the duration that item of work is continuously carried out, the use of respite periods or alternatives that can be employed to attenuate the noise level to comply with the criteria or satisfy their sense of offense to the excavation or construction noise.

8.8.4.Excavation And Construction Vibration Monitoring

Although we do not expect it should a vibration complaint be received, we recommend that when the nominated works proceed, a vibration sensor be used to monitor that

source of the induced velocity of the vibration on the outer wall of the adjoining closest sensitive receivers #1.

If the level of vibration being created is above the criteria, (though highly doubtful), discuss and come to an agreement with the person making the complaint mitigation measures that can be employed including changes to work times, apply respite periods or alternatives that can be employed to either reduce or attenuate the vibration level to comply with the criteria or satisfy their sense of offense to the excavation or construction vibration being created.

9. OPERATIONAL NOISE EMISSION STATEMENT

Due to the nature of the development the only expected operational noise would be the mechanical exhaust system as the site contains multiple private dwellings with private spaces and two external communal open spaces on the lower ground.

During this stage of the development mechanical services designs have not been completed and therefore we cannot comment on compliance.

We do note that due to the low nature of background noise within the area specific acoustic attention must be paid to the final designed mechanical exhaust system. Based on our experience this would consist of the following;

- Acoustic silencing on the car park ventilation system
- Acoustic treatment of Air Cooled Condensers serving the air conditioning systems

Mechanical ventilation systems such as toilet exhaust typically contain a small internally mounted fans that do not affect background noise or neighbours.

The mechanical services equipment must comply with the relevant criteria being RBL+5dB(A) during the day and evening and inaudible inside adjacent receivers.

10. DEMOLITION & CONSTRUCTION NOISE EMISSION STATEMENT

As addressed within this acoustic report we expect the demolition and construction noise to not exceed the EPA's highly affected criteria. We have no specific acoustic recommendations for site in regards to demolition and construction noise.

11. TRANSPORT NOISE IMPACT STATEMENT

As addressed within section 6.3 we believe the acoustic impact of cars on the area would be negligible due to the requirement of the cars to drive slower. The site also contains approximately 29 car spots being significantly higher occupant to car spot ratio than existing and therefore would reduce the load on local street parking.

12. CONCLUSION

Based on our above assessments we believe the site can easily achieve acoustic compliance with all relative standards and regulations. Due to the overall quiet nature of the area there are no acoustic requirements or recommendations for the architectural structure.

From our review we can confirm that no mechanical supply of outside air is required and glazing requirements can be met with standard 6.38Lam glass.

We do note that during the CC stage specific attention must be paid to the mechanical ventilation system to ensure compliance with RBL+5dB(A).

Based on our assessments carried out within this acoustic report we expect the development of this project to be able to be suitably built in a method that is in full compliance with the criteria set out by the following codes and regulations;

- AS 2436; 2010- 'Guide to noise and vibration control on construction, demolition and maintenance sites'
- Environmental Protection Agency (EPA) Interim Construction Noise Guideline 2009
- Noise Guide to Local Government
- Noise Policy for Industry 2017
- North Sydney Council DCP
- SEARS guideline

13.RESPONSE TO DPHI

Further to our previous issue of our acoustic report council has responded with RFI's as shown below;

Acoustic privacy

29. Provide a revised acoustic report that addresses potential operational noise on residents and neighbours associated with :

- a) use of ground floor private open spaces and rooftop terrace (including the private swimming pools)
- b) operation of rooftop air conditioner condensers
- c) rising noise being carried up the building cut out into windows located above the basement access way.

We note that we have addressed the above in the following sections;

- a) Addressed within section 7.4 Private Open Spaces. – Private open spaces including the use of pools have been added.
- b) Addressed within section 7.2 Mechanical services – Roof top ACC plant addressed and preliminary calculations included.
- c) Addressed within section 7.3 Vehicle Usage. – Potential canyon effect has been addressed, calculations based on noise to internal receivers added.

End of Report

2 CONWAY AVE, ROSE BAY

Background Noise Monitoring Location #1

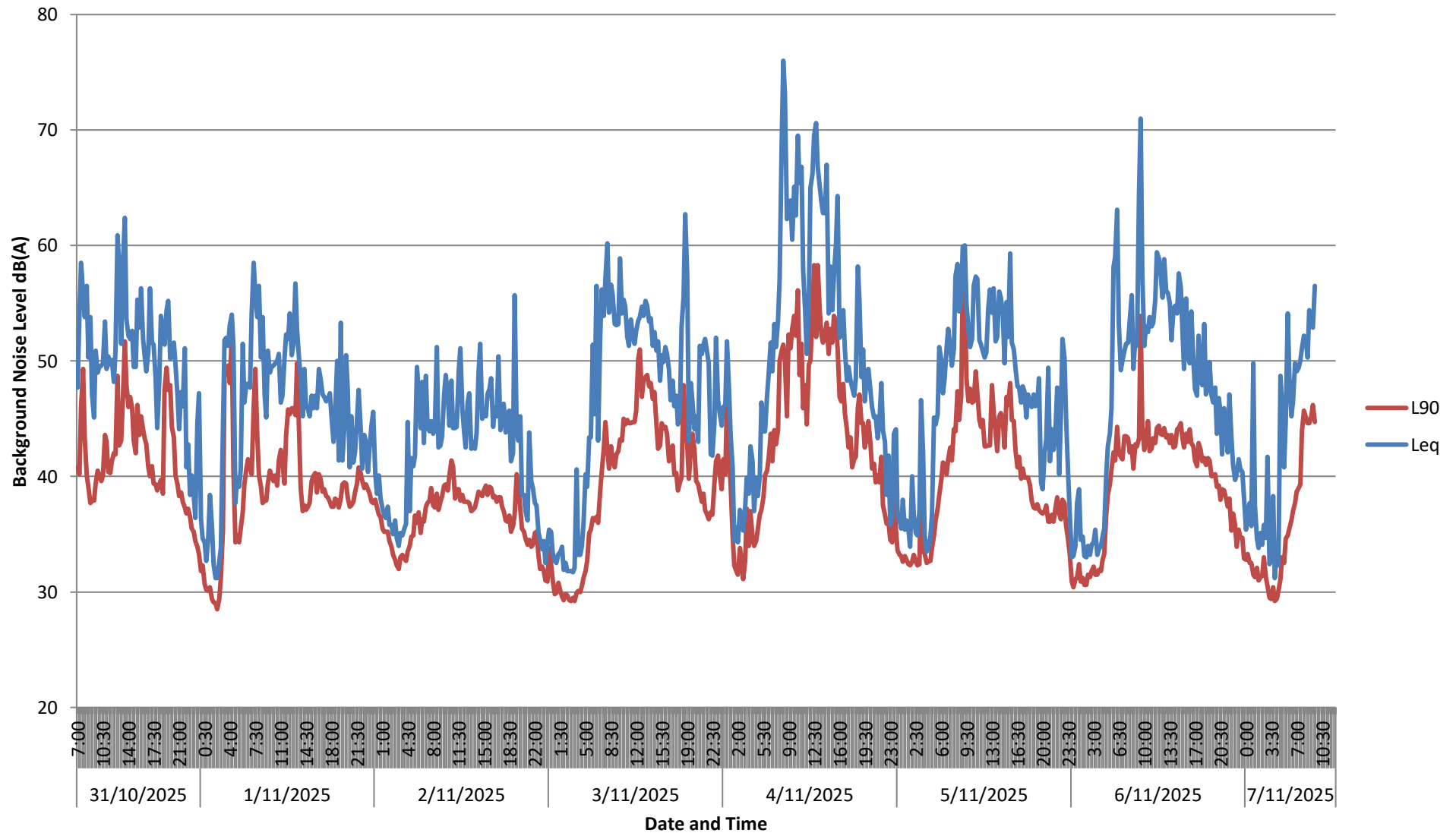


Table 3-4 Summary of Atterberg Limits and Linear Shrinkage Results

Test / Sample ID	BH01_0.3-0.4m	BH01_0.7-0.8m	BH02_0.6-0.7m	1328-EL/1
Borehole ID	BH01M	BH01M	BH02M	BH02M
Sample Depth (mBEGl)	0.3-0.4 m	0.7-0.8 m	0.6-0.7 m	0.6-0.7 m
Unit	1	2a	2b	2b
Material ¹	Fill	Aeolian Soil	Residual Soil	Residual Soil
USCS Description	Silty SAND	SAND	Silty CLAY	Silty CLAY
Aggressivity				
Chloride Cl (ppm)	3.1	6.2	3.7	-
Sulfate SO ₄ (ppm)	6.2	43	24	-
pH	6.8	7.4	6.8	-
Electrical Conductivity (µS/cm)	24	57	28	-
Atterberg Limits				
Moisture Content (%)	18.9	12.5	15.6	16.9
Liquid Limit (%)	-	-	-	38
Plastic Limit (%)	-	-	-	20
Plasticity Index (%)	-	-	-	18
Linear Shrinkage (%)	-	-	-	8.5

Note 1 More detailed descriptions of the subsurface conditions at each borehole location are available on the borehole logs presented in **Appendix A**.