Environmental Noise Assessment

Proposed Residential Development

At 11 Karakul Road, Hamilton

On behalf of Brisbane Housing Company Limited

23BRA00150 R01_0

About TTM

For 40 years, we've been at the centre of the Australian development and infrastructure industry. Our unique combination of acoustics, data, traffic and waste services is fundamental to the success of any architectural or development project.

We have over 50 staff, with an unrivalled depth of experience. Our industry knowledge, technical expertise and commercial insight allow us to deliver an exceptional and reliable service.

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Revision Record

No.	Author	Reviewed/Approved	Description	Date
A	A Ashworth	S Yorke	Internal draft	13/05/2024
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Executive Summary

TTM was engaged by Brisbane Housing Company Limited to undertake an environmental noise assessment of a proposed residential development located at 11 Karakul Road, Hamilton. The assessment was based on the Northshore Hamilton Priority Development Area (PDA) Development Scheme (October 2022) and Brisbane City Council City Plan 2014 Planning Scheme.

City Plan 2014 planning scheme codes and overlays were utilised where relevant and acceptable outcomes applied. Minimum façade treatments (glazing requirements) are recommended to comply with AO21 of the BCC Multiple Dwelling Code.

The Industrial amenity overlay code was assessed and nearby industrial uses are not expected to adversely impact the development.

It is recommended that mechanical plant with the potential to adversely impact nearby sensitive receivers is acoustically screened in accordance with code acceptable outcomes. Furthermore, it is also recommended that a mechanical plant noise assessment is conducted once plant selections are finalised to ensure noise emissions comply with criteria.

Compliance with the Northshore Hamilton PDA scheme and City Plan 2014 planning scheme is predicted to be achieved based on the recommendations outlined in Section 7 of this report.

Contents

Table Index

Figure Index

1 Introduction

1.1 Background

TTM was engaged by Brisbane Housing Company Limited to undertake an environmental noise assessment of a proposed residential development located at 11 Karakul Road, Hamilton. This report will form part of a development application for consideration by relevant authorities.

1.2 References

This report is based on the following:

- Northshore Hamilton Priority Development Area (PDA) Development Scheme (October 2022)
- Brisbane City Council *City Plan 2014*
- *Noise impact assessment planning scheme policy* - Schedule 6, City Plan 2014
- Development plans shown in Appendix A
- Site inspection, noise measurements, analysis and calculations conducted by TTM

1.3 Scope

The assessment includes the following:

- Description of the development site and proposal
- Measurement of existing ambient noise levels and statement of assessment criteria relating to environmental noise emissions
- Assessment of offsite noise intrusion on the residential component of the development
- Details of noise control recommendations to be incorporated into the development.

2 Site Description

2.1 Site Location

The site is described by the following:

- Lot 1 on SP337697
- 11 Karakul Road, Hamilton

The site locality is shown in Figure 1.

Figure 1: Site Locality (approximate)

2.2 Description of Surrounding Environment

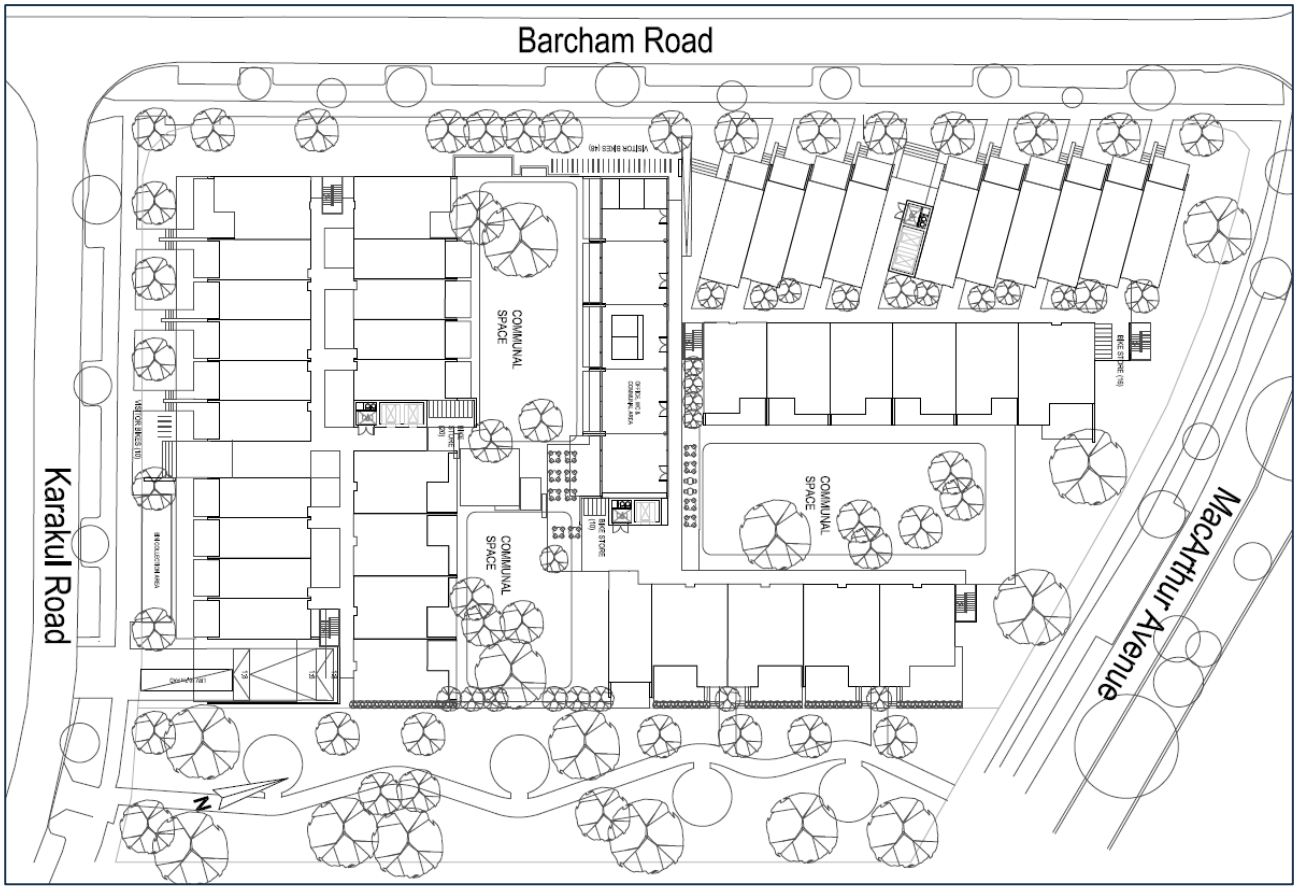
The site is bound by MacArthur Avenue to the north, vacant land to the east, Karakul Road to the south and Barcham Road to the west. The current acoustic environment primarily consists of local road traffic noise intermittent aircraft pass-by noise, industrial noise was not noticeable on site.

3 Proposed Development

3.1 Development Description

The proposal is a residential development comprising of 4 to 5 storey residential units (and basement car parking). A plan of the development is shown in Figure 2. Further development plans are provided in Appendix A.

Figure 2: Proposed Development Plan – Ground Floor



4 Measurements

4.1 Equipment

The following equipment was used to measure existing noise levels:

- ARL Ngara environmental noise monitor (SN# 87824A)
- Norsonic 140 environmental noise monitor (SN# 1406505)
- RION NC-73 acoustical calibrator (SN# 10697023)

All equipment was calibrated by a National Association of Testing Authorities (NATA) accredited laboratory. The equipment was field calibrated before and after the measurement session. No significant drift from the reference signal was recorded.

4.2 Unattended Noise Monitoring

Unattended noise monitoring was conducted to establish the potential industrial noise impact levels between Monday 29th April and Wednesday 1st May 2024. The noise monitor was located as shown in Figure 3. The monitor position was considered representative of the noise environment at the site and surrounds with consideration to access and security requirements.

Figure 3: Noise Monitoring Location

The noise monitor was in a free-field location and 1.5m above ground level. The monitor was set to measure statistical noise levels in 'A'-weighting, 'Fast' response, over 15 minute intervals. Noise levels were measured

in accordance with Australian *Standard AS1055:2018 Acoustics – Description and Measurement of Environmental Noise* (AS1055). An additional Norsonic noise logger was also set to record audio with a trigger noise level of 70dB(A). The audio recordings were used to confirm if the L_{Amax} levels were from an industrial noise or an extraneous noise source.

Attended noise measurements were undertaken close to nearby industrial noise sources and were used in addition to the unattended noise logging data.

Weather during the monitoring period was generally fine (source: Bureau of Meteorology).

4.3 Noise Source Measurements

Noise levels associated with typical activities which may impact noise sensitive receivers were taken from similar investigations conducted by TTM. Measurements were conducted generally in accordance with Australian Standard AS1055.

4.4 Results of Noise Measurements

4.4.1 Ambient Noise Levels

Table 1 presents the measured ambient noise levels. The Rating Background Level (RBL) was determined in accordance with the BCC *Noise Impact Assessment Planning Scheme Policy* (NIAPSP). Graphical presentation of the measured levels is shown in Appendix B. The measurement results were used to determine the assessment criteria for the development.

Table 1: Measured Ambient Noise Levels

Time Period	Measured Noise Levels, dB(A)	
	RBL L_{90}	L_{eq}
Daytime (7am – 6pm)	44	57
Evening (6pm – 10pm)	46	54
Night time (10pm – 7am)	42	52

4.4.2 Industrial Noise Levels

Table 2 presents the highest noise levels measured on the site during the noise monitoring period.

Table 2: Industrial Noise Levels – Noise Logging

Dates	Average Maximum sound pressure level ($L_{Aeq,1hr}$)	
	Day & Eve 7am – 10pm	Night 10pm – 7am
29 April - 1 May, 2024	57 dB(A)	52 dB(A)

Upon review of the audio measurements, short duration L_{AMAX} maximum noise levels measured at the noise logger were due to non-industrial noises such as aircraft, loud cars and birds chirping close to the noise logger etc. In this case the maximum 1 hour L_{Aeq} assessment will be considered satisfactory as this is already a worst case assessment, as it includes noise from industrial and non-industrial noise sources.

5 Noise Criteria

The applicable noise criteria codes for the site location are the Northshore Hamilton PDA Development Scheme October 2022 and Brisbane City Plan 2014.

5.1 Northshore Hamilton PDA Scheme

Northshore Hamilton PDA Development Scheme (October 2022) states in relation to noise criteria:

2.5.9.1 Noise

Development manages the noise amenity expectations of different land uses, especially sensitive land uses, with consideration for the variety of noise sources that may contribute to background noise levels in the PDA, such as aircraft operations, transport noise, marine activities, industrial activities and mixed-used urban environments.

Development is designed, sited and constructed to:

i. mitigate exposure of occupants to noise impacts from:

a. industrial noise sources,

b. airport and aviation facilities,

c. marine facilities,

d. designated transport noise corridors, and

ii. meet building standards for recommended sound levels for building interiors, and

iii. achieve minimum acoustic environmental values for indoor and outdoor areas.

As per Brisbane City Plan 2014, the site is not within a transport noise corridor (road, rail), however the site is within the industrial amenity investigation overlay as shown in Figure 1. The site is close to the Aircraft Noise Exposure Forecast (ANEF) 20-25 noise overlay but not within it, therefore an aircraft assessment is not a mandatory requirement. The site is not located adjacent to the port marine facilities.

Hence the applicable, potential noise assessment aspects for development application are industrial noise.

Onsite noise activities may be addressed by using acceptable outcomes within City Plan 2014.

Figure 1: BCC Mapping – Noise Contour Overlays

The PDA scheme provides only general noise requirements. The City Plan 2014 planning scheme also applies for the Brisbane area and provides more detail for noise assessment.

5.2 City Plan 2014

To the extent that the Northshore Hamilton Development Scheme calls up the requirements of the Brisbane City Plan, the relevant sections of this plan are addressed in this section.

Table 3 summarises the planning scheme requirements for the site which are relevant to the acoustic assessment.

Table 3: Site Specific Acoustic Details

Location	Zone	Development Code	Overlay Code
Site	Mixed-Use Zone (Northshore Hamilton PDA)	Multiple Dwelling Code	Industrial investigation

5.2.1 Multiple Dwelling Code

The development includes residential accommodation units which are applicable for assessment under the *Multiple Dwelling Code*. Table 4 summarises the acoustic requirements that apply to the site.

Table 4: Multiple Dwelling Code

Performance Outcomes	Acceptable Outcomes
PO21 Development in a zone in the centre zones category or the Mixed use zone must: (a) be located, designed and constructed to protect bedrooms and other habitable rooms from exposure to noise arising from non-residential activities outside the building; (b) be designed and constructed to achieve a minimum reduction in sound pressure level between the exterior of the building and the bedrooms or indoor primary living areas of 30dBA. Note—A noise impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome. Note—Site-specific criteria will be identified in a neighbourhood plan for sites within a Special Entertainment Precinct Area or within the Transport noise corridor overlay.	**AO21** Development in a zone in the centre zones category or the Mixed use zone has a minimum acoustic performance of: (a) Rw 35 for glazing (windows and doors) where total area of glazing is greater than 1.8m^2 (b) Rw 32 for glazing (windows and doors) where total area of glazing is less than or equal to 1.8m2.
PO22 Development that includes mechanical plant (including air conditioning plant, heat pumps and swimming pool pumps) ensures it is located, designed and attenuated to achieve the following criteria: • $L_{Aeq,adj,T}$ emitted from mechanical plant is not greater than the rating background level plus 3 at a sensitive use not associated with the development. Note — Where T is • Day (7am to 6pm): 11hr, • Evening (6pm to 10pm): 4hr, • Night (10pm to 7am): 9hr. Where • $L_{Aeq,adj,T}$ is the A-weighted equivalent continuous sound pressure level during measurement time T, adjusted for tonal and impulsive noise characteristics, determined in accordance with the methodology described in the Noise impact assessment planning scheme policy. • The rating background level is determined in accordance with the methodology described in the Noise impact assessment planning scheme policy. **Note—A noise impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome.**	**AO22** Development ensures mechanical plant is acoustically screened from nearby sensitive uses.

The development is located in a Mixed-use zone. The following is recommended for compliance with the code requirements (details in Section 7).

- PO21 – Apply AO21 for habitable rooms (residential): glazing minimum.
    - Rw35 for room with over 1.8m^2 of glazing
    - Rw32 for room with 1.8m^2 or less of glazing
- PO22 – Apply AO22 to acoustically screen mechanical plant from nearby noise sensitive uses (e,g., residential uses onsite and/or offsite)

5.3 Industrial Amenity Overlay Code

The Industrial Amenity Overlay Code criteria for noise emissions onto onsite sensitive receivers are reproduced in Table 5.

Table 5: Noise (Planning) Criteria - *Table 8.2.13.3.E, Industrial Amenity Overlay Code*

Location where the criteria applies inside a sensitive use	Adjusted equivalent continuous sound pressure level ($L_{Aeq,adj,T}$) to be achieved during the day, evening and night-time periods			Adjusted maximum sound pressure level ($L_{Amax,adj}$) to be achieved during the night-time period
	Day 7am – 6pm	Evening 6pm – 10pm	Night 10pm – 7am	Night 10pm – 7am
Sleeping Areas	35 dB(A)	35 dB(A)	30 dB(A)	45 dB(A)
Other Habitable Rooms	35 dB(A)	35 dB(A)	35 dB(A)	N/A

6 Industrial Noise Assessment

The site is located within an Industrial investigation overlay area of City Plan 2014. As the site is within an industrial investigation as noise assessment against the code to determine potential impacts.

6.1 Noise Sources

The off-site industrial premises with the potential to impact the amenity of the site are outlined below and shown in Figure 4: Potential Industrial Noise Sources.

- Boral (Concrete and Asphalt supplier) - 208 Curtin Ave W, Eagle Farm QLD 4009,
    - approx. 250m from site
- Brisbane Cityworks (Asphalt contractor) - 260 Curtin Ave W, Eagle Farm QLD 4009
    - approx. 230m from site.

Figure 4: Potential Industrial Noise Sources

An assessment of industrial noise onto the proposed development was conducted to determine the acoustic treatment requirements for predicted compliance with the relevant criteria.

Unattended noise monitoring was conducted. The maximum $L_{eq,1hr}$ measured site are 59dB(A) for day (and evening) and 52dB(A) for night time, as shown in Table 2.

Additional attended noise measurements were undertaken close to nearby operation industrial noise sources and were used in addition to the unattended noise logging data.

Table 6 presents the highest noise levels measured on the site during the noise monitoring period.

Table 6: Industrial Noise Levels – Attended Measurements

Time / Date	Location	Measured sound pressure level, L_{Aeq}
11.00am / 29 April, 2024	15m from Boral Site	67 dB(A)

Noise measurements were not possible at Brisbane Cityworks site as no audible noise could be heard from the site during the site visits.

Based on the attended noise measurements and distance attenuation (250m) to the site the noise impacts at the site would be approximately 43dB(A), this ignores screening from intervening buildings. As the noise logging data measured higher noise levels on site, noise logging and not attended measurements will be used as a worst-case assessment.

A calculation was conducted to determine the predicted internal noise level based on the following:

- Noise level (measured): maximum Leq,1hr: 59dB(A) for day / 52dB(A) for night time (Table 2).
- Façade Construction
  - Window construction: minimum R_W35 (>1.8m^2) (as per AO21 of the multiple dwelling code and AO23 of the Retirement and Residential Care Facility Code)
  - Wall and Ceiling Construction: Assumed standard basic construction R_W35+ (likely higher)
- Overall façade R_W = R_W35+.
  - Predicted minimum noise reduction, external to internal: approx. 30dB.
- Predicted maximum internal noise levels:
  - : $L_{eq,1hr}$: 29dB(A) for day / 22dB(A) for night time.
- Noise levels comply with the criteria 35dB(A) for day / 30dB(A) for night time as shown in Table 5.

Based on this assessment the development is expected to sufficiently attenuate external industrial noise sources sufficiently for the proposed uses. This assessment does not mean that industrial noises will be inaudible within the building.

7 Recommendations

Recommended noise mitigation measures are presented in this section to achieve predicted compliance with the relevant assessment criteria.

7.1 Façade Treatments

a. To comply with PO21 of the multiple dwelling code, habitable rooms (residential) require the following minimum acoustic ratings for glazing.

   i. R_W35 glazing for room with over 1.8m^2 of glazing.

   ii. R_W32 glazing for room with 1.8m^2 or less of glazing.

7.2 Management Strategies

The following management strategies are recommended to achieve predicted compliance and minimise noise annoyance:

a. Any speed humps should be bitumen, concrete (as part of the slab), or rubber, and not metal.

b. Any grates or other protective covers in the car park and access driveways must be rigidly fixed in position to eliminate movement and be maintained.

7.3 Mechanical Plant

As detailed mechanical plant selections are not available at this stage, it is not possible to carry out a detailed examination of any attenuation measures that may be required to achieve the noise criteria.

To comply with planning scheme acceptable outcomes for mechanical plant, we recommend the following for plant with the potential to adversely impact nearby sensitive receivers:

> *Development ensures mechanical plant is acoustically screened from nearby sensitive uses.*

The definition of 'acoustically screened' is provided in Table SC1.2.3.B of Brisbane City Plan 2014, Schedule 1 Definitions:

> *The source of noise is completely screened from view of habitable rooms (including balconies, patios, decks and verandas) of an adjoining sensitive use by solid, gap free material and construction e.g. acoustic fence, building, or enclosure.*
>
> *Acoustic barrier: Solid, gap free barrier with minimum surface density of 12.5kg/m^2*

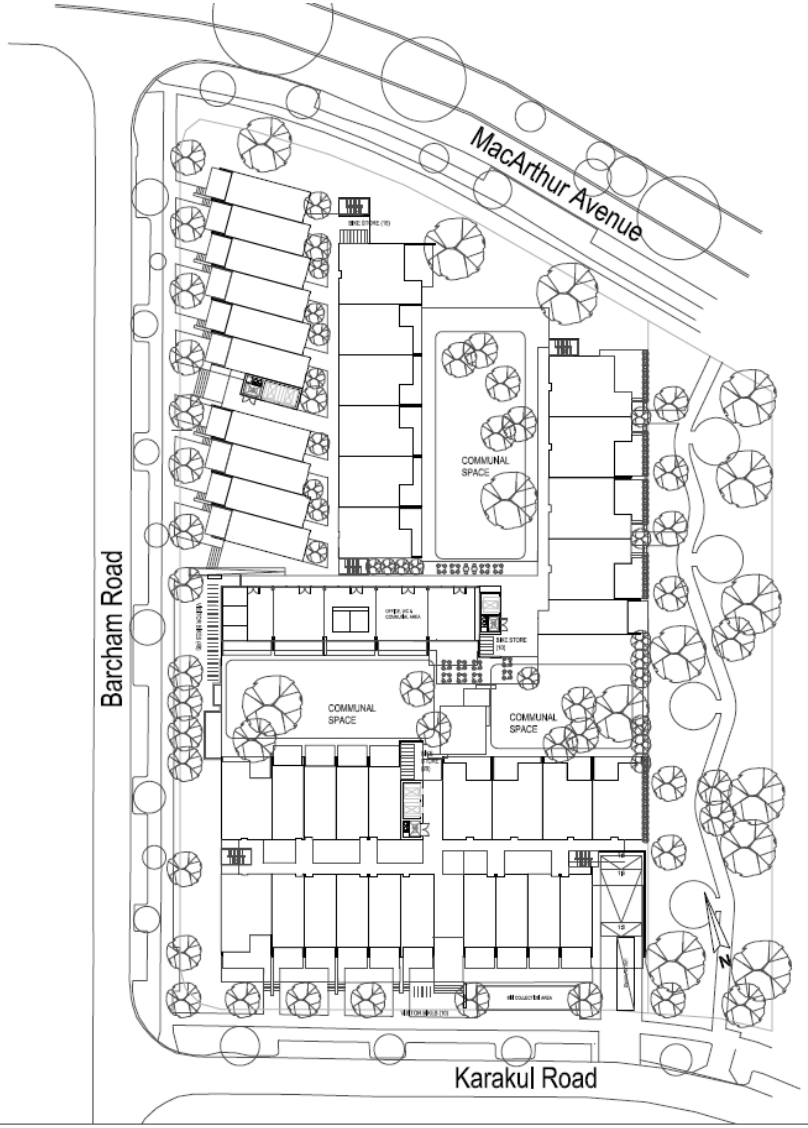
Furthermore, it is also recommended that a mechanical plant noise assessment is conducted once plant selections are finalised to ensure noise emissions comply with criteria.

8 Conclusion

TTM was engaged by Brisbane Housing Company Limited to undertake an environmental noise assessment of a proposed residential development located at 11 Karakul Road, Hamilton.

Compliance with the Northshore Hamilton Priority Development Area (PDA) planning scheme and Brisbane City Council *City Plan 2014* planning scheme is predicted to be achieved based on the recommendations outlined in Section 7 of this report.

Appendix A Development Plans



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11 KARAKUL ROAD, HAMILTON

hayball

Melbourne | Sydney | Brisbane | Canberra

Drawn By | Author
Checked By | Checker
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Rev | Date | Description

Drawing Title
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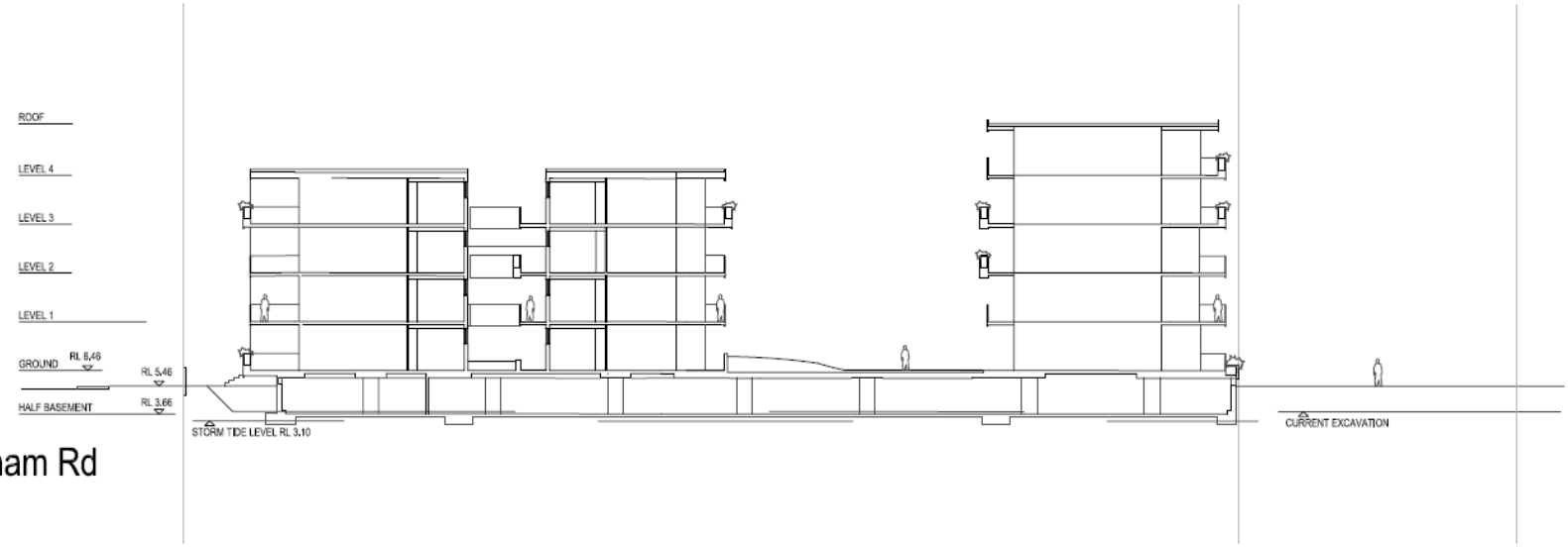
Status
CONSULTANT COORDINATION

Project No | Drawing No | Revision
2714



Project Title
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11 KARAKUL ROAD, HAMILTON

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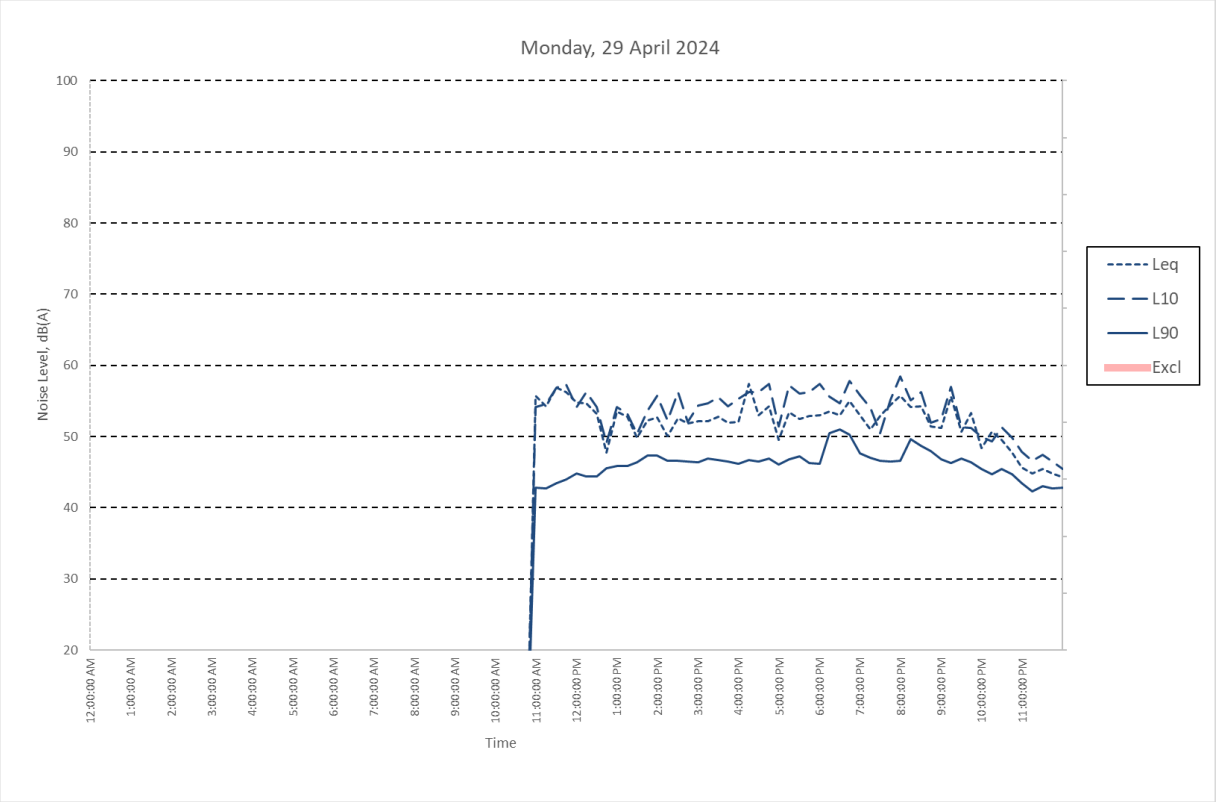
Drawing Title
EAST WEST SCHEMATIC SECTION

Status
CONSULTANT COORDINATION

Project No
2714

Appendix B Unattended Noise Monitoring Graphs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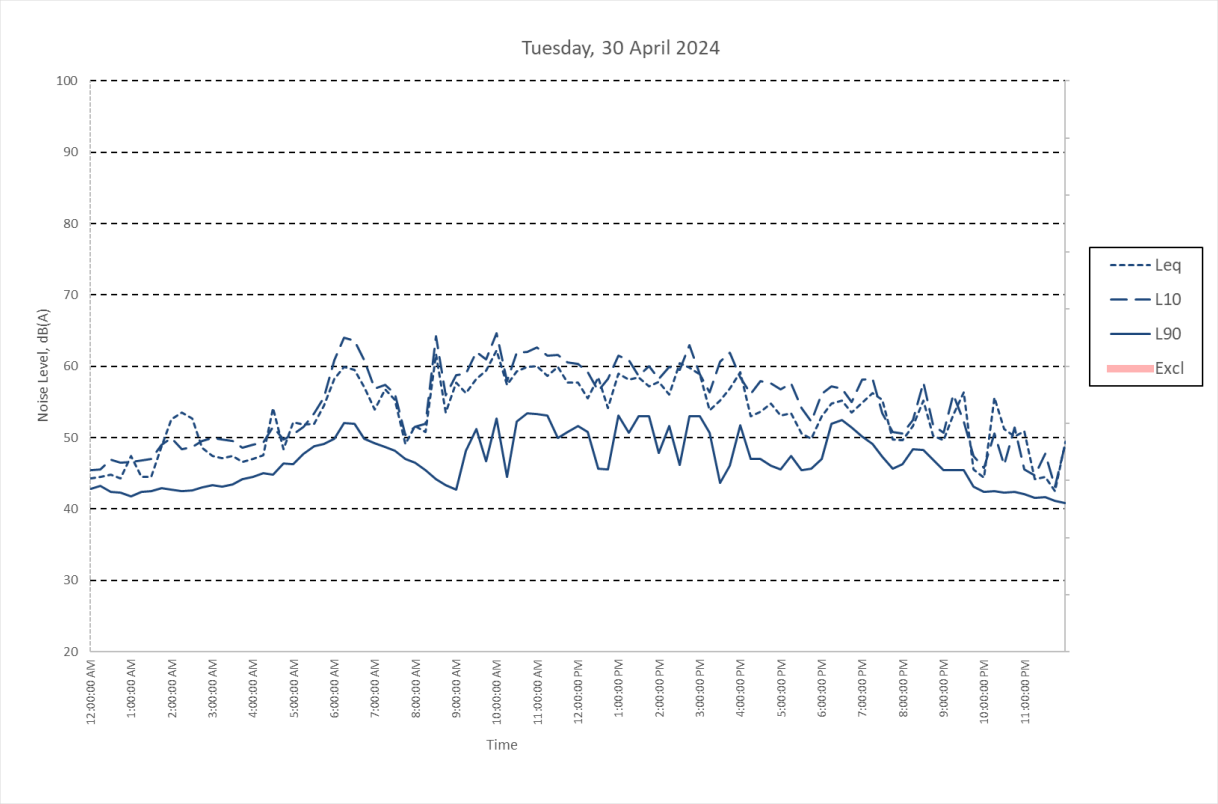
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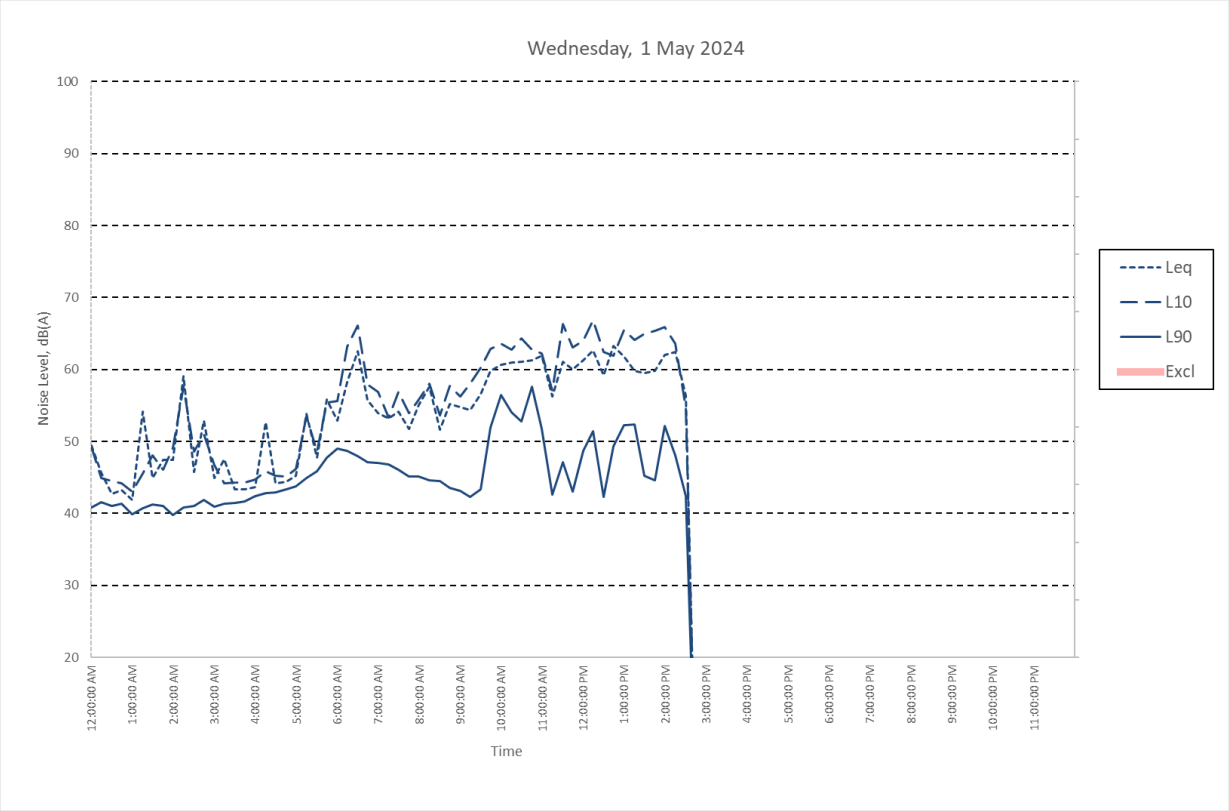
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