

100 Edinburgh Road, Castlecrag

SSDA Acoustic Assessment

Project ID	20251035.1
Document Title	SSDA Acoustic Assessment
Attention To	Builtcom Development Holdings Pty Limited

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	17/11/2025	20251035.1/1411A/R0/WY	WY		WY

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1 INTRODUCTION

Acoustic Logic has been engaged to assess noise impacts associated with the proposed mixed-use development to be located at 100 Edinburgh Road, Castlecrag.

This report will assess potential noise impacts associated with the following:

- Traffic noise impacts from nearby busy roads.
- Mechanical plant noise emissions (in principle), including but not limited to lifts, waste disposal, condenser units, and miscellaneous ventilation and extraction fans.

The subject site and local context are indicated in Figure 1.

The report has been prepared for the sole purpose of a development application assessment and should not be used or relied on for any other purpose.

2 REFERENCED DOCUMENTS & GUIDELINES

The following planning instruments and guidelines have been used in the assessment:

- Architectural drawings provided by FJC Studio, dated 8th October 2025.
- State Environmental Planning Policy *Transport & Infrastructure* (**TISEPP**) 2021
- NSW Department of Planning Development Near Rail Corridors and Busy Roads (**DNRCBR**) 2008
- Willoughby City Council *Development Control Plan* (**DCP**) 2023
- Australian and New Zealand Standard AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors
- NSW Environmental Protection Authority (**EPA**) *Noise Policy for Industry* (**NPfi**) 2017

3 DESCRIPTION OF PROPOSAL

The site is located at 100 Edinburgh Road, Castlecrag and will be a mixed-use retail/residential development. The site will consist of 4 levels of basement parking for retail, residential and visitor parking, a loading dock on lower ground floor with supermarket, retail and duplexes on ground floor, 10 storeys of residential units and rooftop communal open spaces, pool and mechanical plant.

3.1 NEAREST SENSITIVE RECEIVERS

The following table lists the nearest sensitive receivers surrounding the site. An aerial photo of the site indicating nearby noise sensitive receivers and measurement locations is presented in Figure 1.

Table 1 – Sensitive Receivers

Receiver (Figure 1)	Land Use	Comment
R1	Mixed Use	Mixed use 1 storey retail/residential development located north of site
R2	Residential	Residential 1 storey development to the immediate north east of the site
C1	Commercial	Retail 1 storey development located to the immediate east of the site
R3	Residential	Residential 2 storey development to the immediate south of the site
R4	Residential	Residential 2 storey development to the south west of the site
R5	Residential	Residential 1 storey development to the north west of the site

3.2 ENVIRONMENTAL NOISE AND VIBRATION SOURCES

Significant environmental noise sources are the nearest roadways to the site, being Edinburgh Road to the immediate north of the site and Eastern Valley Way to the immediate west of the site. Both of these roads carry high volumes of traffic.

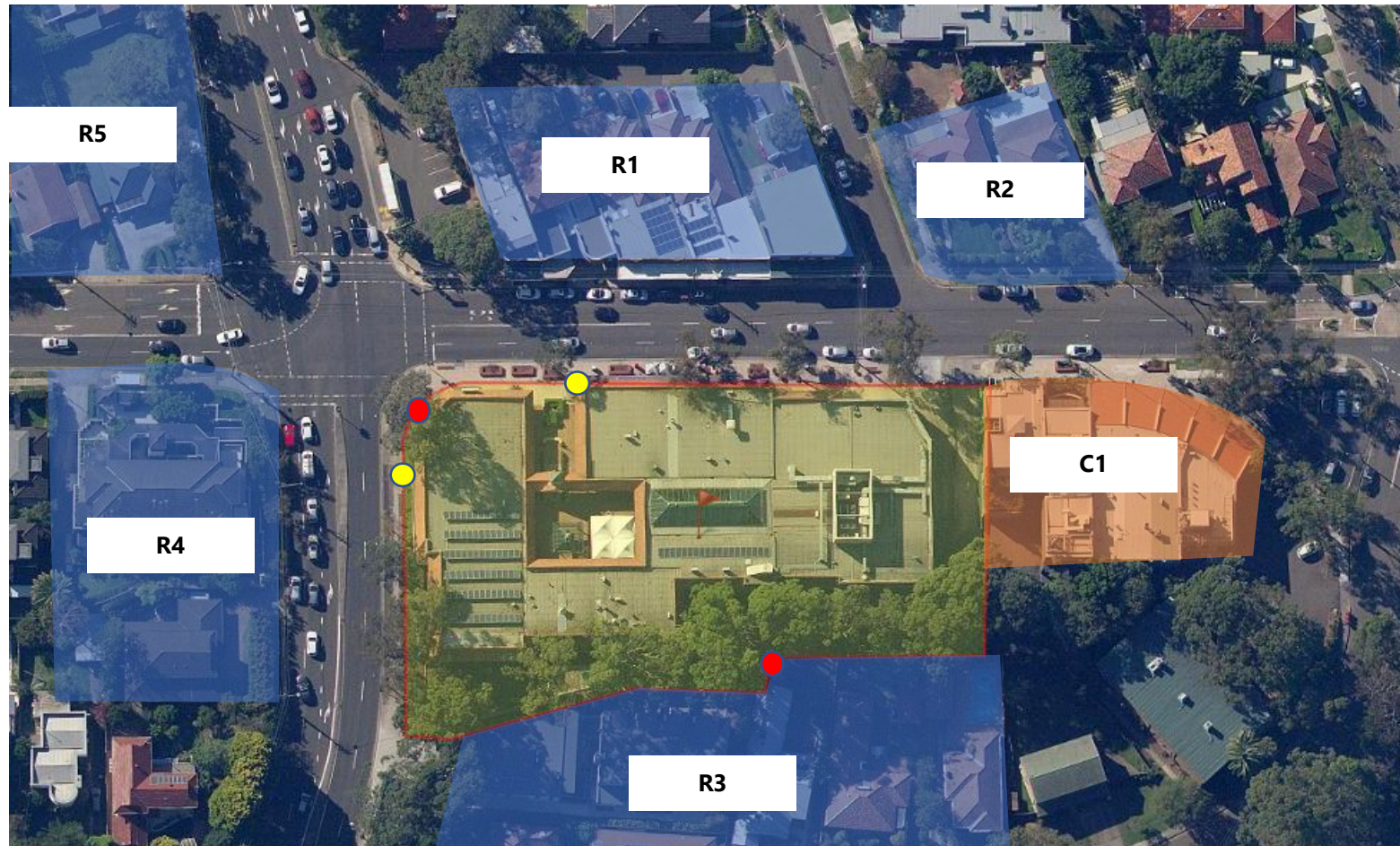


Figure 1 – Site Plan Showing Monitoring Locations and Surrounding Land Uses/Receivers

● - Unattended Noise Monitoring Location	■ - Residential
● - Attended Noise Monitoring Location	■ - Commercial
	■ - Site

4 AMBIENT NOISE MONITORING

Monitoring has been undertaken to obtain the following data:

- Background noise levels at the surrounding residential properties.
- Traffic noise levels from nearby busy roads.
- Noise levels generated by adjacent land uses.

Figure 1 above shows the monitoring locations used.

4.1 NOISE DESCRIPTORS

Ambient noise constantly varies in level from moment to moment, so it is not possible to accurately determine prevailing noise conditions by measuring a single, instantaneous noise level.

To quantify ambient noise, a 15-minute measurement interval is typically utilised. Noise levels are monitored continuously during this period, and then statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters obtained from the data are:

L_{eq} - represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of noise impact as it closely corresponds with how humans perceive the loudness of time-varying noise sources (such as traffic noise).

L₉₀ – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The L₉₀ parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L₉₀ level.

L₁₀ is used in some guidelines to measure noise produced by an intrusive noise source since it represents the average of the loudest noise levels produced at the source. Typically, this is used to assess noise from licenced venues.

L_{max} is the highest noise level produced during a noise event, and is typically used to assess sleep arousal impacts from short term noise events during the night. It is also used to assess internal noise levels resulting from aircraft and railway ground vibration induced noise.

L₁ is sometimes used in place of L_{max} to represent a typical noise level from a number of high-level, short-term noise events.

4.2 UNATTENDED LONG TERM NOISE MONITORING

4.2.1 Equipment Used

Unattended noise monitoring was conducted using two Rion NL-42 (Type 2) monitors.

The monitoring was continuous, with statistical noise levels recorded at 15-minute intervals throughout the monitoring period. Measurements were taken on "A" frequency weighting and fast time response.

All monitoring equipment used retains current calibration - either manufacturers' calibration or NATA certified calibration. The monitors were field calibrated at the beginning and the end of the measurement with no significant drift in calibration noted.

4.2.2 Locations Monitored

One unattended Rion type noise monitor was located along the corner of Edinburgh Road and Eastern Valley way to determine traffic levels. The monitor was approximately 4m from the kerb. Refer to Figure 1 for detailed location.

A second unattended Rion type noise monitor was placed along the southern boundary of the site. The monitor was shielded from traffic movements from the existing development on 100 Edinburgh Road and from any mechanical plant from surrounding developments. The monitor had a 180 degree view of sensitive receivers **R2**. This monitor was to determine background noise levels of sensitive receivers **R2**. Refer to Figure 1 for detailed location.

4.2.3 Calculated Noise Levels

Ambient and rating background levels have been determined from the long term, unattended noise monitoring data based on the methodology in the Noise Policy for Industry Fact Sheet B. Appendix 1 contains the data collected, and the periods identified as being affected by adverse weather conditions or extraneous noise (as defined by NPfI Fact Sheet B).

Weather data was obtained from records provided by the Bureau of Meteorology for the weather station located at Horsley Park AWS.

The NPfI day, evening and night periods are:

- Day - period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays
- Evening - the period from 6 pm to 10 pm
- Night - the remaining periods

Representative traffic noise levels have been presented in accordance with the Road Noise Policy (RNP) 2011.

4.2.4 Rating Background Noise Levels

The following table summarises the rating background noise levels determined for the day, evening and night periods as defined in the NPfl.

Table 2 – NPfl Rating Background Noise Levels

Location	Assessment Background Noise Level (dB(A) L ₉₀)		
	Day	Evening	Night
South Boundary of Site (See figure 1) 180° view of sensitive receiver R2	42	39	33

4.2.4.1 Ambient/ Traffic Noise level

The data for the day and night periods as defined in the TISEPP have been processed using the guidelines in the EPA Road Noise Policy to determine the ambient noise levels at the monitoring locations.

Table 3 – Measured Traffic Noise Levels

Location	Traffic Noise Level (dB(A) L _{eq,period})	
	Day (7am to 10pm)	Night (10pm to 7am)
Corner of Edinburgh Road and Eastern Valley Way, 4m From Kerb, 180° view of traffic movements, (See Figure 1)	69 dB(A) _(15hr)	63 dB(A) _(9hr)

4.3 ATTENDED SHORT TERM NOISE MONITORING

4.3.1 Equipment Used

Attended noise monitoring was conducted using a Norsonic Nor140 sound level meter.

All monitoring equipment used retains current calibration - either manufacturers' calibration or NATA certified calibration. The monitors were field calibrated at the beginning and the end of the measurement with no significant drift in calibration noted.

4.3.2 Locations Monitored and Monitoring Period

The monitoring locations are indicated in Figure 1. An attended noise measurement was conducted on Edinburgh Road, along the northern boundary of the site and was approximately 5m from the kerb. A second measurement was conducted along Eastern Valley Way on the western boundary of the site, approximately 4m from the kerb. The sound level meter for both measurements had an unobstructed view of traffic for both measurements. Refer to Figure 1 for detailed location. Measurements were conducted on Friday 28th April 2023 from 1:00 PM to 1:30 PM

4.3.3 Measured Results

The attended noise measurements were dominated by traffic noise.

Table 4 – Attended Ambient Noise Measurements

Location	Time of Measurement	Measured Noise Level dB(A)_{Leq(period)}
Eastern Valley Way, 4m from kerb, 180° view of the road	Between 1pm and 1:15pm Friday, 28 th April 2023	69 dB(A) _(15mins)
Edinburgh Road, 5m from kerb 180° view of the road	Between 1:15pm and 1:30pm Friday, 28 th April 2023	62 dB(A) _(15mins)

4.4 TRAFFIC NOISE LEVEL SUMMARY

Table 5 – Traffic Noise Level Summary

Location	7am to 10pm dB(A)	10pm-7am dB(A)
Eastern Valley Way, 4m from kerb, 180° view of the road	69 dB(A) _(15hr)	63 dB(A) _(9hr)
Edinburgh Road, 5m from kerb 180° view of the road	62 dB(A) _(15hr)	56 dB(A) _(9hr)

Note: Night time levels for Edinburgh Road based on ambient/ traffic noise level day and night time difference.

5 TRAFFIC NOISE INTRUSION ASSESSMENT

5.1 TRAFFIC NOISE INTRUSION CRITERIA

A traffic noise intrusion assessment has been conducted based on the requirements of the following traffic noise criteria and standards.

5.1.1 Willoughby DCP 2023

No quantitative noise intrusion criteria for residential developments are specified in the Willoughby 2023 DCP, noise intrusion criteria has been determined with relevant state policies and guidelines (see below).

5.1.2 SEPP Transport & Infrastructure 2021

Considering Eastern Valley Way currently generates an AADT of more than 20,000, clause 2.130 of the TISEPP has been applied, which requires the following:

"This clause applies to development for any of the following purposes that is on land or adjacent to the road corridor for a freeway, a tollway or transit way or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of the RTA) and that the consent authority considers is likely to be adversely affected by road noise or vibration:

- (a) A building for residential use,
- (b) A place of public worship,
- (c) A hospital,
- (d) An education establishment or childcare centre.

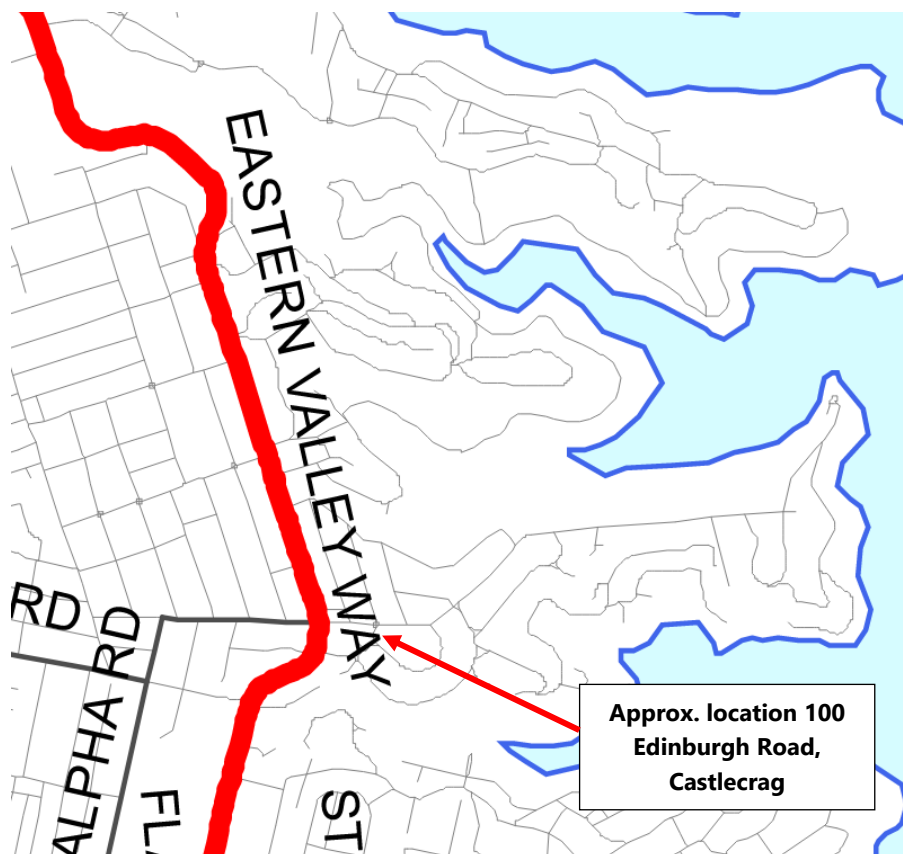


Figure 2 – SEPP Map No.10 and Approximate Location of Proposed Development

5.1.3 NSW Department of Planning – Development near Rail Corridors or Busy Roads – Interim Guideline

In conjunction with clause 2.130 of the TISEPP, the development will need to ensure compliance with the DNRCBR guideline which states the following:

"The following provides an overall summary of the assessment procedure to meet the requirements of clauses 87 and 102 of the Infrastructure SEPP. The procedure covers noise at developments for both road and rail.

If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded:

- (a) In any bedroom in the building – 35 dB(A) at any time between 10pm and 7am,*
- (b) Anywhere else in the building (other than a garage, kitchen, bathroom or hallway) – 40 dB(A) at any time."*

5.1.4 Summary of Noise Intrusion Criteria

This assessment shall be conducted in accordance with the most stringent criteria specified above, which is summarised below:

Table 6 – Internal Noise Level Criteria

Location	Time Period	Criteria
Sleeping Areas	Night (10pm-7am)	35 dB(A) $L_{eq}(9 \text{ hour})$
Living Areas	Any Time	40 dB(A) $L_{eq}(15 \text{ hour})$

5.2 COMPLYING CONSTRUCTIONS

External noise intrusions into the proposed development were assessed using the measured traffic, rail and aircraft noise levels reported above as a basis.

Calculations were performed considering the orientation of windows, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted. Acoustic treatment required to ensure compliance with the assessment criteria are detailed in this section.

Internal noise levels will primarily be as a result of noise transfer through the windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound. Noise transfer through the masonry elements will not be significant and need not be considered further.

The constructions necessary to achieve the noise levels are detailed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to traffic, aircraft and rail noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

5.2.1 Glazed Windows and Doors

The following constructions are recommended to comply with the project noise objectives. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria. All external windows and doors listed are required to be fitted with Q-lon type acoustic seals. **(Mohair Seals are unacceptable)**.

Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable.

It is recommended that only window systems having test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended. The complying glazing thickness for each area is listed in the table on the following page.

In addition to complying with the minimum scheduled glazing thickness, the R_w rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in Table 8 for all areas. Where nominated, this will require the use of acoustic seals around the full perimeter of open-able frames and the frame will need to be sealed into the building opening using a flexible sealant.

With detailed window layouts being coordinated at detailed design stage, the below table has been provided to detail minimum glazing requirements based on area.

Table 7 – Recommended Minimum Residential Glazing Constructions

Facade	Space	Glazing Area	Minimum Glazing Construction	Acoustic Seals
Corner of Eastern Valley Way/Edinburgh Road	Bedroom	< 10 m ²	12.38mm laminate	Yes
		> 10 m ²	10.38mm laminate/100mm air gap/4mm float	
Eastern Valley Way	Living Room	< 12 m ²	12.38mm laminate	
		> 12 m ²	10.38mm laminate/100mm air gap/4mm float	
	Bedroom	< 10 m ²	12.38mm laminate	
		> 10 m ²	10.38mm laminate/100mm air gap/4mm float	
Corner of Eastern Valley Way/Southern Development Facade	Living Room	< 5 m ²	6.38mm Laminate	
		> 5 m ²	10.38mm Laminate	
	Bedroom	< 3 m ²	6.38mm Laminate	
		> 3 m ²	10.38mm Laminate	
Edinburgh Road	Living	< 15 m ²	6.38mm Laminate	
		> 15 m ²	10.38mm Laminate	
	Bedroom	< 12 m ²	6.38mm Laminate	
		> 12 m ²	10.38mm Laminate	
All other	Bedroom and Living Room	All	6mm Float	
All residential facades			6mm Float	

Table 8 – Minimum R_w of Glazing Assembly (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
4mm Float	27
6mm Float	29
6.38mm Laminate	31
10.38mm Laminate	35
12.38mm Laminate	37

5.2.2 Entry Doors

All doors shall have glazing thicknesses equal to those recommended in Section 5.21. or are to be 45mm thick solid core doors and are to have Raven RP10 to the top and sides and Raven RP38 to the underside of a swing door.

Note that mohair seals in windows and doors are not acceptable where acoustic seals are required.

5.2.3 External Roof & Ceiling Construction

The roof is proposed to be of masonry construction. No further upgrading is required to meet noise level requirements. In the event any penetrations are required through the external lining of any of the system for other building services, gaps should be filled with acoustic sealant to ensure compliance with acoustic criteria stipulated within this report.

5.2.4 External Wall Construction

External walls that are of masonry construction are acoustically acceptable without any further treatment. Where lightweight cladding is designed, final wall requirements shall be provided in detailed design stage based on the inclusion of both wall noise intrusion and glazing noise intrusion pathways. Indicatively, a minimum R_w 45 wall type is required.

In the event any penetrations are required through the external lining of any of the system for other building services, gaps should be filled with acoustic sealant to ensure compliance with acoustic criteria stipulated within this report.

5.2.5 Natural Ventilation Requirements

With respect to natural ventilation of the dwelling, the NSW Department of Planning document "Development near Busy Roads and Rail Corridors - Interim Guideline" dictates that:

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

With windows open, the allowable internal noise goal is permitted to be 10dB(A) higher than when the windows are closed (i.e. – allowable level in bedrooms becomes 45dB(A), and 50dB(A) in living rooms).

Analysis of the data gathered from site indicates that compliance with the DNRCBR 'windows open' noise levels are able to comply with the DNRCBR 'windows open' noise levels without supplementary ventilation in all areas except in units where any of the bedroom or living room facades of the unit are along Edinburgh Avenue or Eastern Valley Way.

Where any supplementary ventilation system is to be installed, this should be acoustically designed to ensure that the acoustic performance of the acoustic treatments outlined above is not reduced and does not exceed EPA and Council criteria for internal noise levels and noise emission to nearby properties.

6 NOISE EMISSION ASSESSMENT

The major sources of noise from the operation of the project site are from mechanical plant which would generally consist of carpark ventilation plant, apartment air conditioning condensing units, bathroom ventilation fans (which would typically be small fans located internally), vertical resident lifts and miscellaneous ventilation fans. Other sources of noise include vehicle noise emissions associated with the carpark and loading dock.

6.1 NOISE EMISSION CRITERIA

The noise emission criteria from the project site shall comply with the requirements of the following documents.

6.1.1 Willoughby DCP 2023

No quantitative noise emission criteria for residential developments is specified in the Willoughby 2023 DCP, noise emission criteria have instead been determined with NSW EPA Noise Policy for Industry (see below).

6.1.2 NSW EPA Noise Policy for Industry (NPfI) 2017

The Noise Policy for Industry (NPfI) provides a methodology for assessing the need for noise mitigation:

- Determine project specific “trigger” levels.
- Predict noise emissions to surrounding properties and assess against the trigger levels.
- Noise mitigation should be assessed when the predicted noise emissions exceed the trigger levels.

In this assessment, the trigger levels determined using the NPfI will be adopted as assessment criteria for permanent plant and equipment.

Project specific noise “trigger” levels are determined based on the land use impacted, ambient noise environment and the time of day.

The EPA NPfI has three sets of criteria which are all required to be satisfied, namely “intrusiveness”, “amenity” and “maximum noise levels”. Intrusiveness and amenity are generally assessed at the most affected part of the property, or at the balcony or façade of an apartment or upper level of residence. Maximum noise levels are generally assessed outside bedroom windows.

The derivation of the project specific trigger levels is discussed below.

6.1.2.1 Intrusiveness Criteria

The guideline is intended to limit the audibility of noise emissions at residential receivers only. Noise emissions measured using the L_{eq} descriptor should not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality (in accordance with Fact Sheet C of the Policy).

Intrusiveness criteria have been determined using the conservative background noise levels identified in Section 4 and are summarised in the table on the following page.

Table 9 – Intrusiveness Criteria

Location	Period/Time	Assessment Background Noise Level (dB(A) L ₉₀)*	Intrusiveness Noise Emission Trigger Level dB(A) L _{eq} (15min)
Nearby Residences	Day (7am-6pm)	42	47
	Evening (6pm-10pm)	39	44
	Night (10pm-7am)	33	38

6.1.2.2 Amenity Criterion

The amenity guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The *Noise Policy for Industry* sets out acceptable noise levels for various land uses. Table 2.2 on page 11 of the policy has four categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

The *NPfI* requires the project amenity noise level to be calculated in the following manner:

$$L_{Aeq, 15min} = \text{Recommended Amenity Noise Level} - 5 \text{ dB(A)} + 3 \text{ dB(A)}$$

For this assessment, this office will assess noise emissions in accordance with the 'Urban' category, as defined in Table 2.3 of the *NPfI*

Table 10 – NSW EPA NPfI Project Amenity Criteria

Type of Receiver	Time of Day	Recommended Amenity Noise Level – dB(A)L _{eq} (1hour)	Project Amenity Noise Level – dB(A)L _{eq} (15-min)
Residential (Urban)	Day (7:00am – 6:00pm)	60	58
	Evening (6:00pm – 10:00pm)	50	48
	Night (10:00pm – 7:00am)	45	43

6.1.3 Summarised Noise Emission Goals

The project noise trigger levels have been summarised in the below table. The selected trigger levels are based on the lower value of the intrusiveness or amenity criteria for each period of the day.

Table 11 – Summarised Mechanical Plant Noise Emission Goals

Type of Receiver	Time of Day	Project Noise Trigger Level – dB(A) _{Leq(15-min)}
Residential (Urban)	Day (7:00am – 6:00pm)	47
	Evening (6:00pm – 10:00pm)	44
	Night (10:00pm – 7:00am)	43

6.2 ASSESSMENT OF NOISE EMISSIONS

An assessment of noise emissions from the proposed development has been conducted to ensure that the amenity of nearby land users is not adversely affected. Noise emissions from mechanical plant will be assessed in principle.

6.2.1 Mechanical Plant Noise Emissions

The design and selection of apartment and retail related plant have not been undertaken but will generally consist of air conditioning and cooler room condensing units, bathroom and retail ventilation fans (which would typically be small fans located internally), vertical resident and retail customer lifts, truck turntables and miscellaneous ventilation fans for the retail and resident carpark.

Plant rooms are currently proposed to be on levels B1, B2, lower ground, ground and on the roof. The plant room located on B2 and B1 are within the carpark. The lower ground can be shielded from the residents to the south through the usage of a solid barrier with further treatments such as acoustic louvres to be used if the mechanical plant to be located at this space is of higher noise output at lower ground and ground floor plantrooms. Noise emissions from rooftop condenser plant will have minimal impact on surrounding receivers.

All plant that will be selected will be required to meet the noise limits indicated in Section 6.1. If acoustic treatment is ultimately required then this may include enclosing the equipment, treating ducting or acoustic louvres, as required to meet limit noise emissions. Designers should have regard for the fact that allowances should be made in respect of plant locations to minimise impacts on sensitive receivers and to provide sufficient space to incorporate treatment to plant areas to meet the above guidelines.

6.2.2 Noise from the Rooftop Communal Areas and Pool

In regard to the proposed rooftop communal areas and pool, we note the following:

- Towards the north, east, south and west are currently residential dwellings where the top level is on a much lower plane than the proposed communal areas and pool.
- The communal area is for the use of residents (rather than retail tenants) and their visitors only. General activities to be associated with its use is anticipated to be mainly passive activities.
- Additionally, use of the area would also be part of the strata management plan, and be subject to ongoing controls or restrictions to how it is used, for example:
 - Limits on the times of use.
 - Limits on the types of activities which can be undertaken (for example, the playing of amplified music).
 - Restrictions on the numbers of people which can use the space at given times.
- A solid 3.4m tall external façade barrier has been designed around the rooftop communal and pool area from the Level 11 FFL which will aid in further reducing any noise emissions
- Overall acoustic risk to nearby receivers is minimal based on the location of the areas.

7 CONSTRUCTION NOISE AND VIBRATION IMPACTS

A separate Construction Noise and Vibration Management Plan document has been prepared (*Ref: 20250966.3/2909A/R0/SJ*, dated 1st October 2025). This document is provided in Appendix B. Recommendations have been provided to reduce noise levels resulting from the construction of the development based on feasible and reasonable practices.

8 CONCLUSION

This report presents an acoustic assessment of potential noise impacts associated with the proposed mixed-use development to be located at 100 Edinburgh Road, Castlecrag.

External noise intrusion will satisfy the requirements of relevant acoustic requirements summarised in Section 5.1.4 with the recommended acoustic controls in Section 5.2 of this report.

Noise emission from the development will comply with the summarised noise emission requirements in Section 6.1.3 provided the recommendations and management controls identified in Section 6.2 are incorporated.

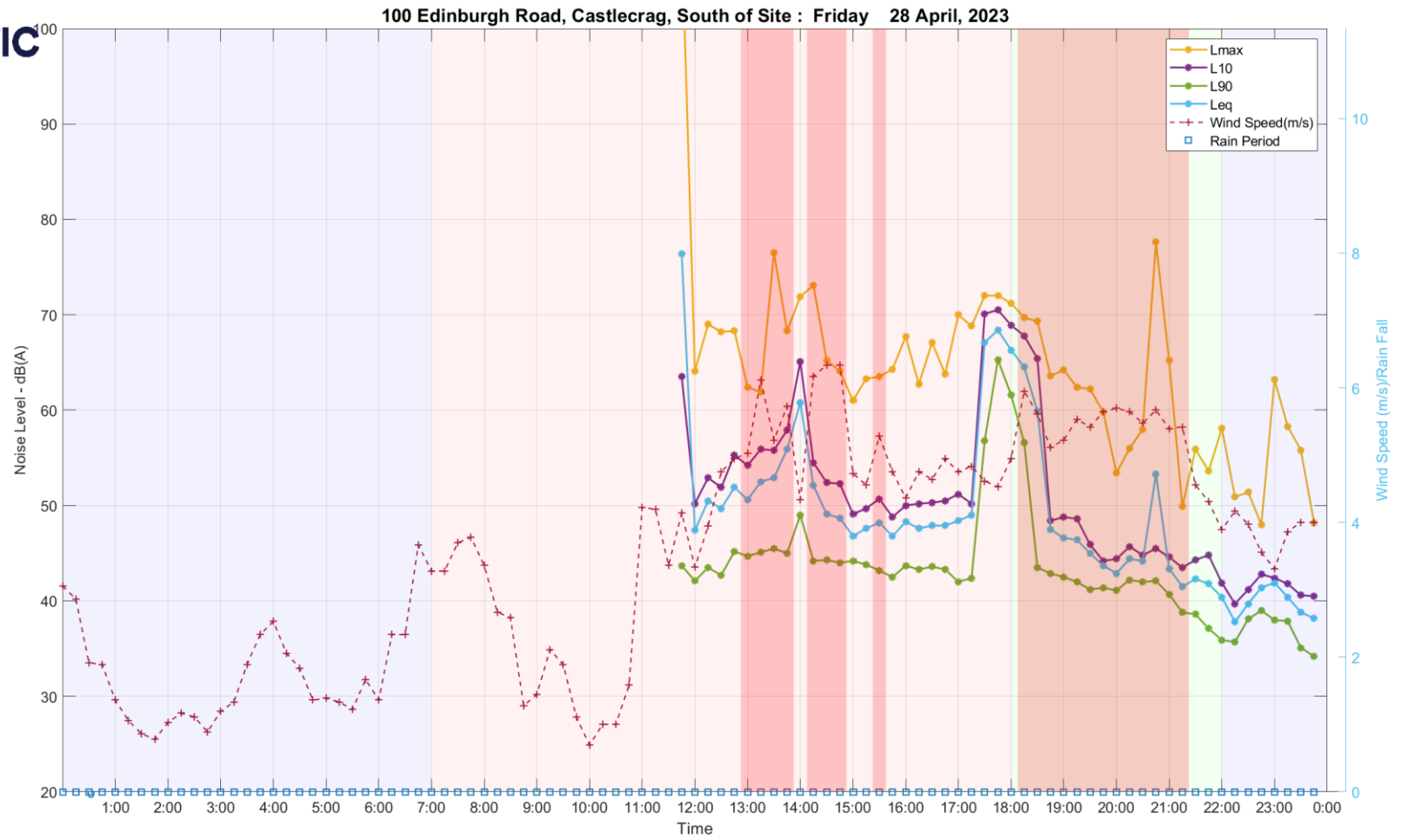
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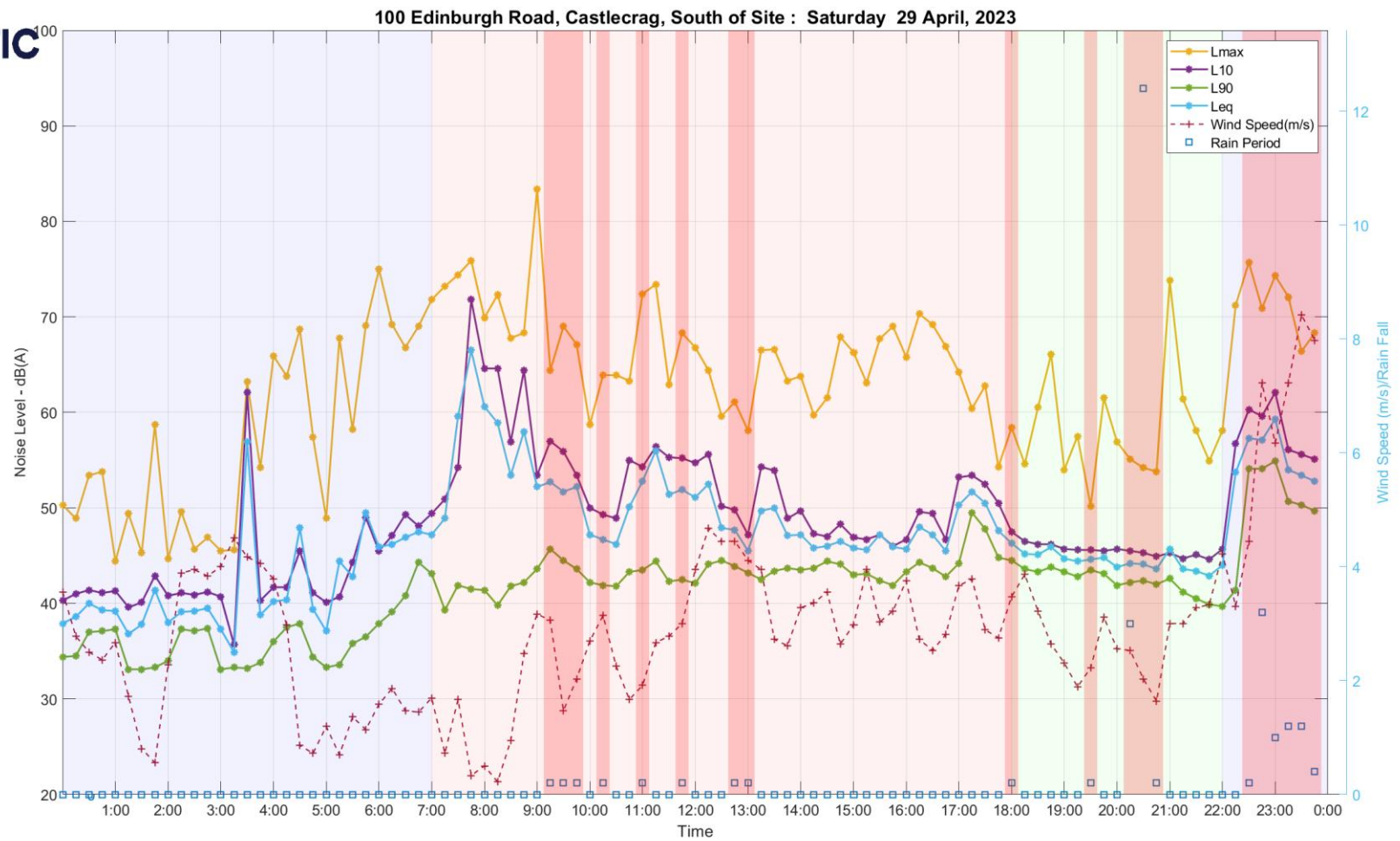
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Acoustic Logic Pty Ltd
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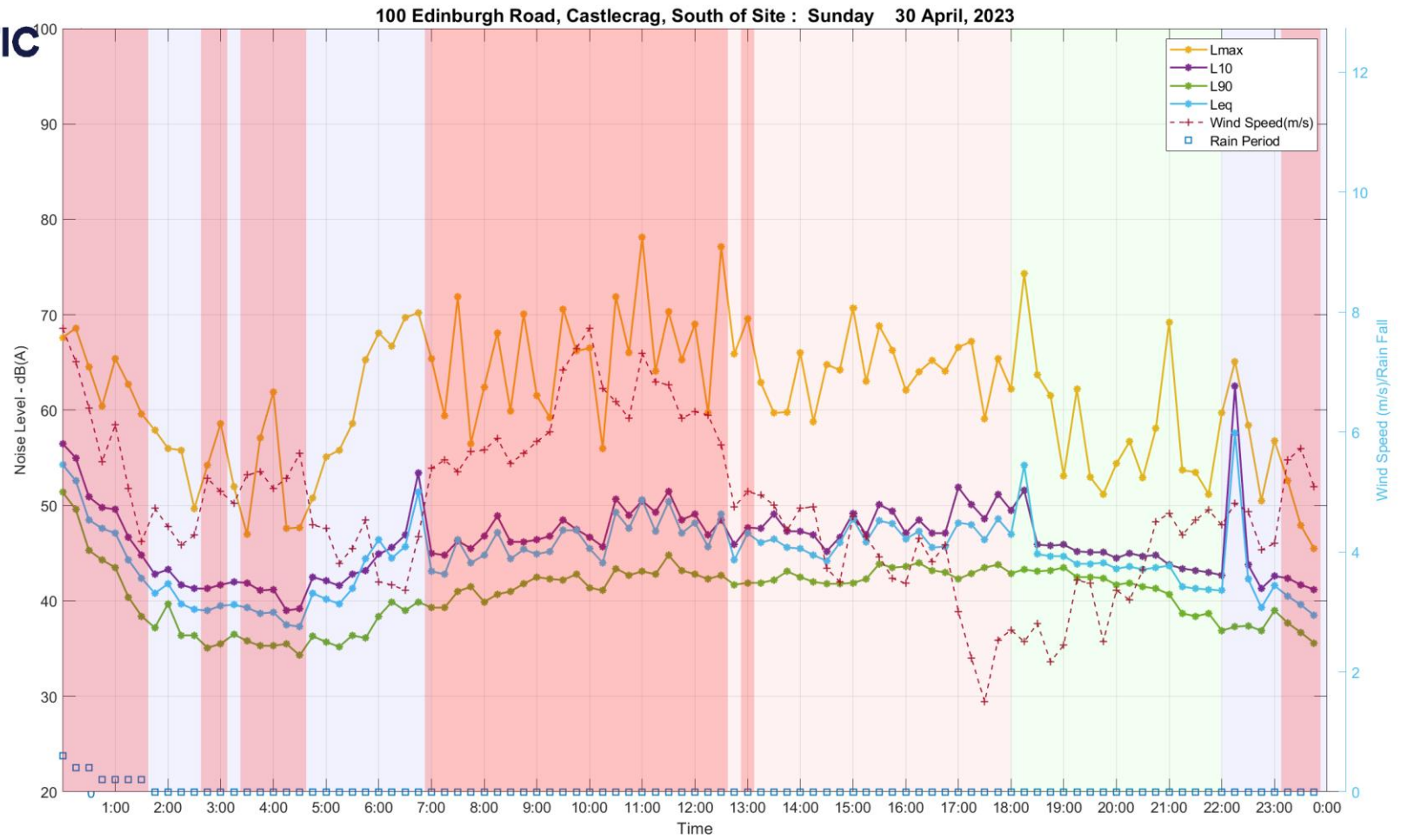
APPENDIX A AMBIENT NOISE MONITORING DATA

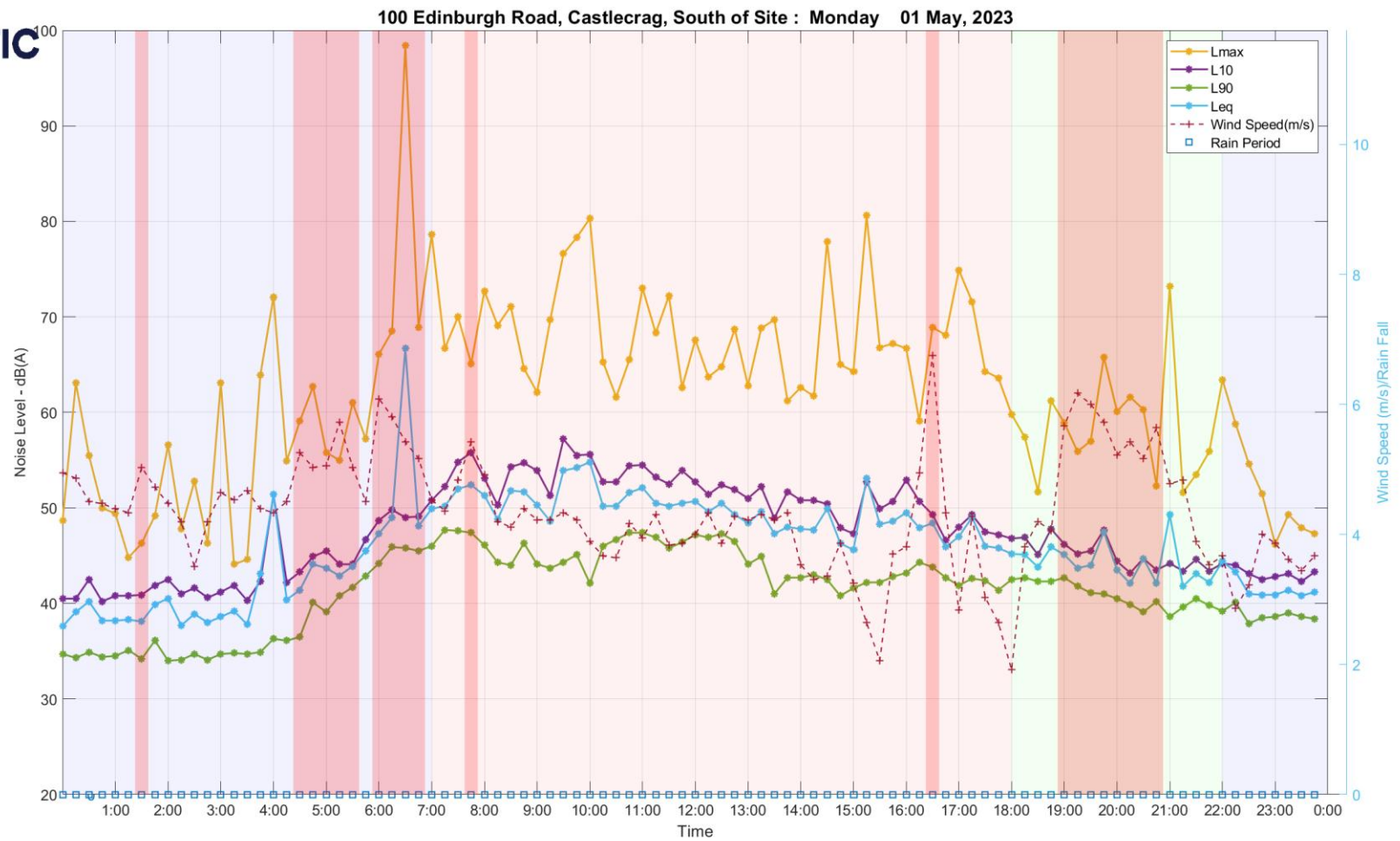


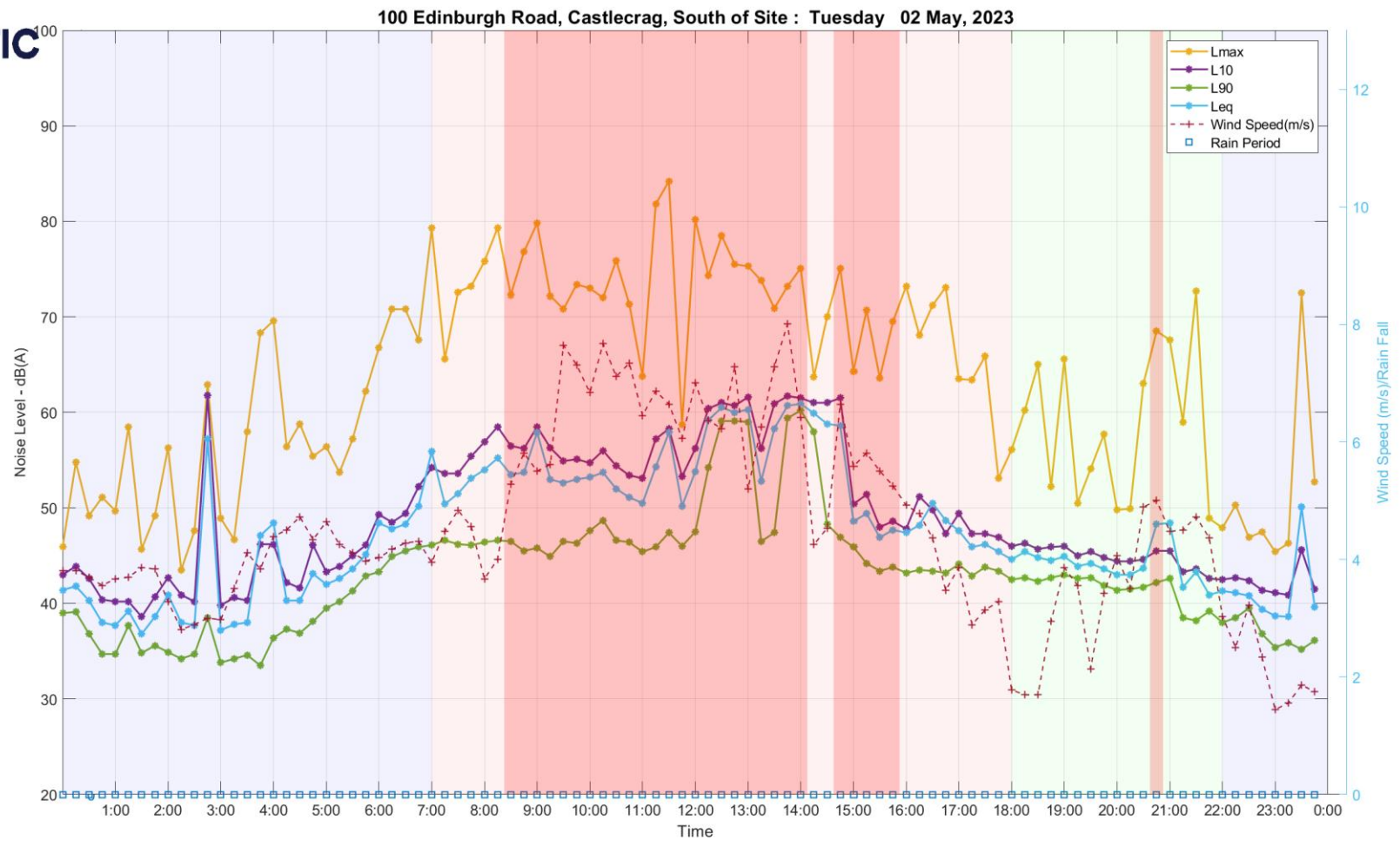




**ACOUSTIC
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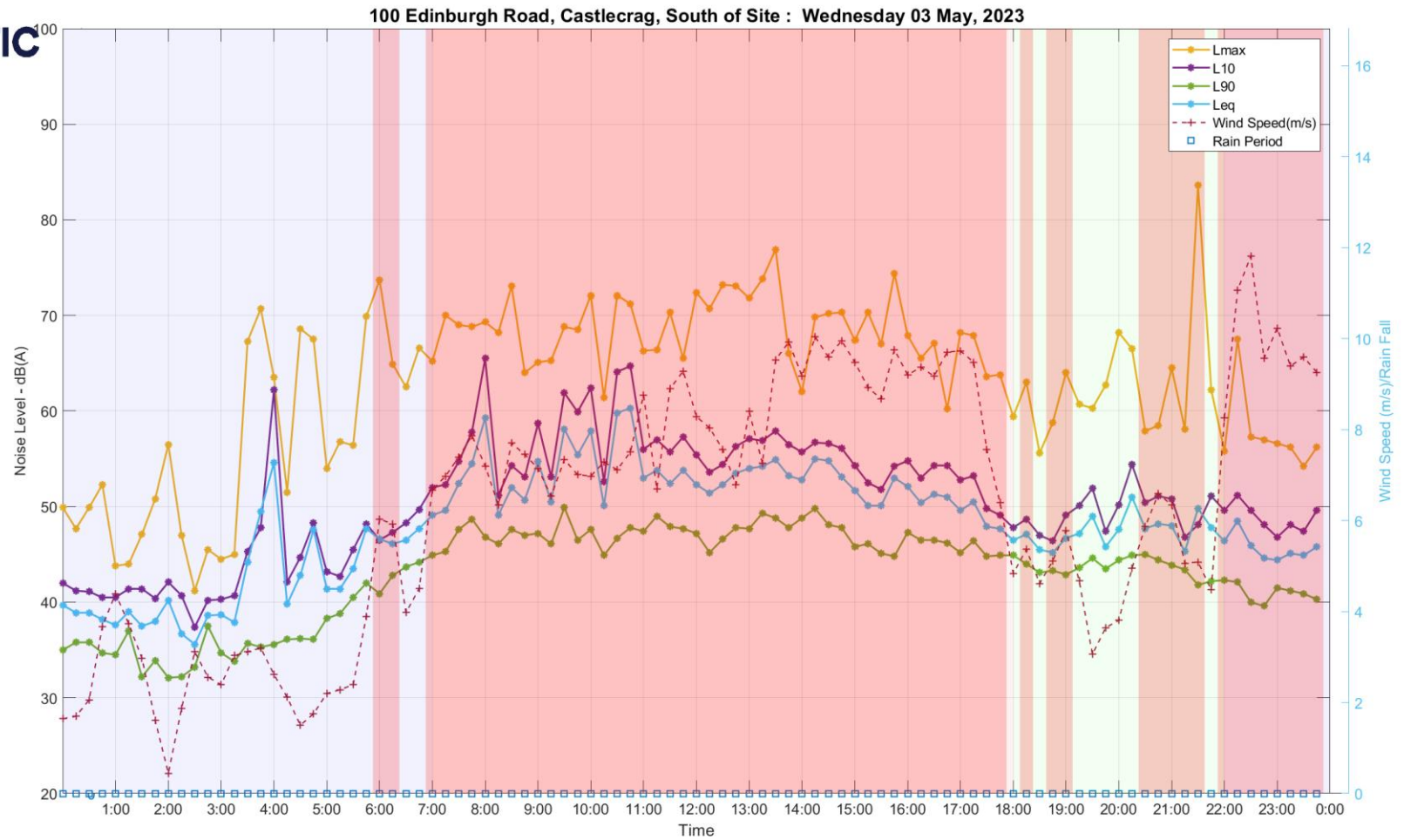






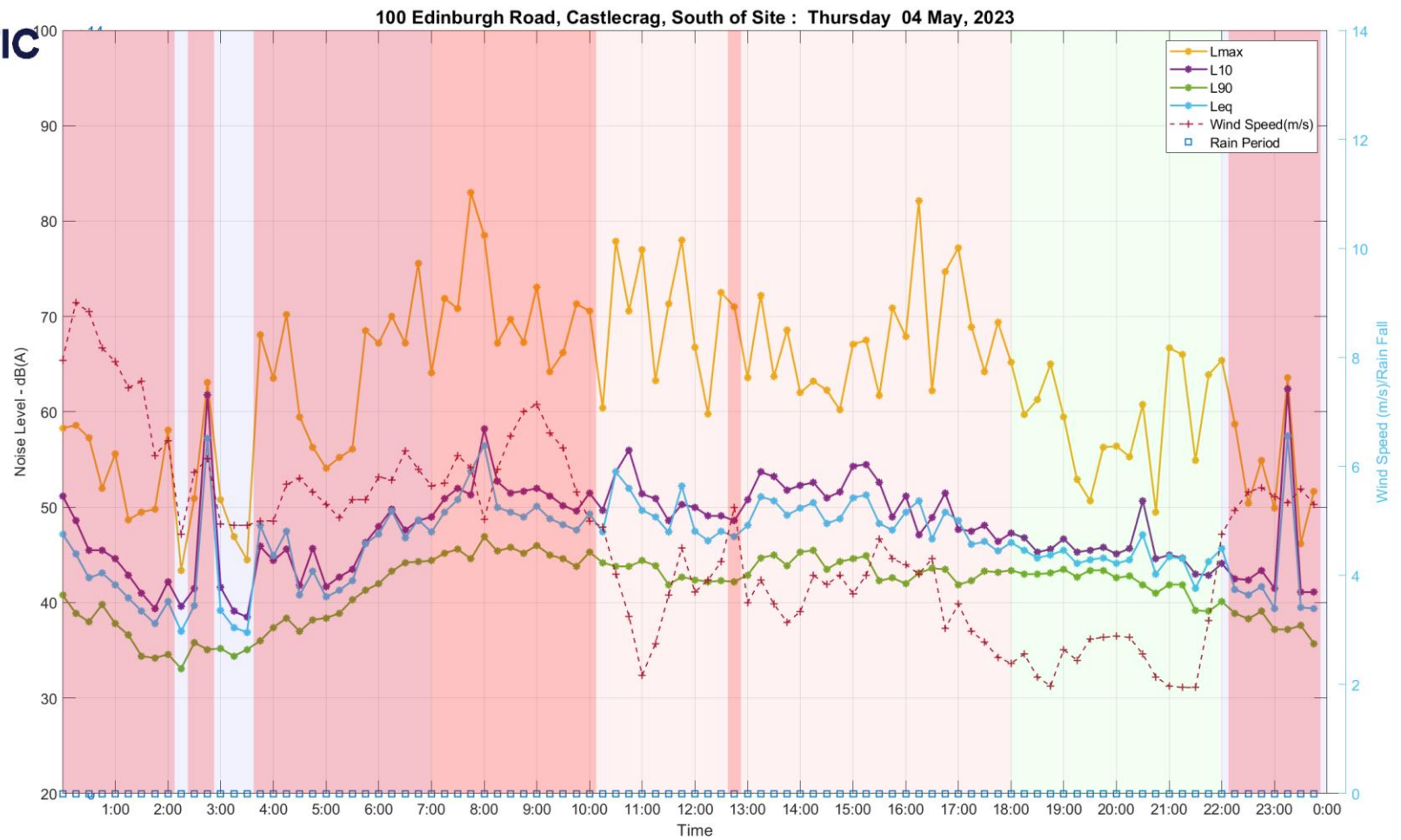


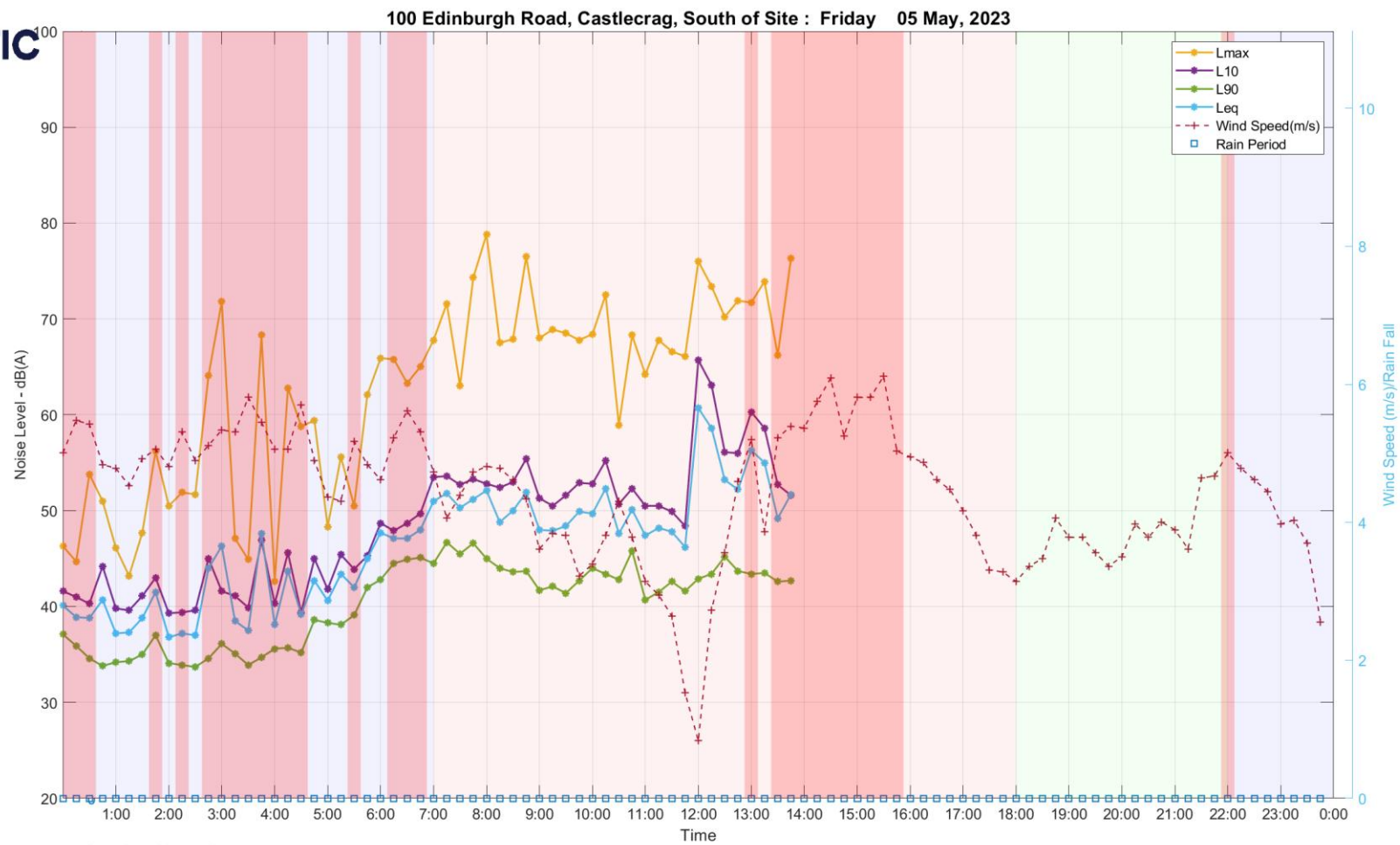
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Wind Speed is corrected using factor 1.0000 based on logger location

APPENDIX B CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN

100 Edinburgh Road, Castlecrag

Construction Noise and Vibration Management Plan

Project ID	20250966.3
Document Title	Construction Noise and Vibration Management
Attention To	Builtcom Constructions Pty Ltd

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	1/10/2025	20250966.3/2909A/R0/SJ	SJ		LA

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1 INTRODUCTION

This report has been prepared to present a Construction Noise and Vibration Management Plan (CNVMP) for the mixed-use development to be located at 100 Edinburgh Road, Castlecrag.

This report has been prepared to address Willoughby City Council consent conditions 67, 68, 78 and 79 of the project's development consent (DA-2024/13), provided below for reference.

"67. Noise and Vibration Management

The Applicant must prepare a Demolition, Excavation and Construction Noise and Vibration Management Plan and the Plan must:

- a) be prepared by a suitable qualified expert and submitted to the satisfaction of the Principal Certifying Authority;*
- b) be prepared in consultation with all noise sensitive receivers where noise levels exceed the construction noise management level, in accordance with EPA guidelines;*
- c) describe the measures that would be implemented to ensure:*
 - i) best management practice is being employed; and*
 - ii) compliance with the relevant conditions of this consent;*
- d) describe the proposed noise and vibration management measures in detail;*
- e) identify the selection of alternative construction plant and machinery to avoid the generation of excessive noise levels;*
- f) include strategies that have been developed to address impacts to noise sensitive receivers, where noise levels exceed the construction noise management level, for managing high noise generating works;*
- g) implement intra-day respite periods for construction activities identified as annoying;*
- h) implement noise reducing site/work practices and require regular noise checks of equipment;*
- i) describe the consultation undertaken to develop the strategies in b) above;*
- j) evaluate and report on the effectiveness of the noise and vibration management measures. Monitoring reports shall be submitted to Council on a monthly basis and demonstrate compliance with the criteria contained in the EPA Interim Construction Noise Guideline (ICNG);*
- k) include a complaints management system that would be implemented for the duration of the project; and*
- l) A copy of the CNVMP is to be submitted to Council prior to the commencement of any work. The CNVMP (as revised from time to time) must be implemented by the Applicant for the duration of the construction works.'*

68. Silencing Devices

Sound attenuating devices shall be provided and maintained in respect of all power-operated plant used during demolition, excavation, earth works and the erection of the structure.

(Reason: Maintain amenity to adjoining properties)

78. Construction Noise

Construction noise and vibration shall be controlled to comply with the requirements as set out in the EPA Interim Construction Noise Guideline (ICNG), appropriate vibration criteria and the Construction Noise and Vibration Management Plan (CNVMP). Noise levels shall be managed so as to not exceed the following noise criteria wherever possible:

(a) Affected residential properties (during ICNG recommended standard hours) – Noise affected level of $RBL + 10dB$ and Highly noise affected level (i.e. noise level above which there may be strong community reaction) $\leq 75dB(A)Leq(15mins)$.

(b) Affected commercial premises (i.e. office, retail outlets etc.) – $70dB(A)Leq(15mins)$.

Where noise or vibration criteria are exceeded, appropriate measures to control excessive noise and/or vibration shall be implemented immediately and the CNVMP shall be reviewed. Any variations to the CNVMP must be approved by Council.

(Reason: Amenity)

79. Noise and Vibration Management

The Construction Noise and Vibration Management Plan (CNVMP) shall be complied with for the duration of all development site works. Noise monitoring shall be carried out on a monthly basis and vibration monitoring in the case of a complaint being received. This monitoring shall be documented in reports and submitted to the Principal Certifying Authority and demonstrate compliance with the criteria contained in the EPA Interim Construction Noise Guideline (ICNG). Copies of these monitoring reports and the CNVMP (as revised) shall be kept at the development site and produced to Council authorised officers on request.

(Reason: Amenity and environmental compliance)"

2 SITE DESCRIPTION

The site is located at 100 Edinburgh Road, Castlecrag and will be a mixed-use retail / residential development. The site will consist of 3 levels of basement parking for retail, residential and visitor parking, a loading dock on basement 1, three two-storey units and sixteen 2 and 3 bed apartments.

Significant environmental noise sources are the nearest roadways to the site, being Edinburgh Road to the immediate north of the site and Eastern Valley Way to the immediate west of the site. Both of these roads carry high volumes of traffic.

The following table lists the nearest sensitive receivers surrounding the site. An aerial photo of the site indicating nearby noise sensitive receivers and measurement locations is presented in Figure 1.

Table 1 – Sensitive Receivers

Receiver (Refer Figure 1)	Land Use	Comment
R1	Mixed Use	Mixed use 1 storey retail/residential development located north of site
R2	Residential	Residential 1 storey development to the immediate north east of the site
C1	Commercial	Retail 1 storey development located to the immediate east of the site
R3	Residential	Residential 2 storey development to the immediate south of the site
R4	Residential	Residential 2 storey development to the south west of the site
R5	Residential	Residential 1 storey development to the north west of the site

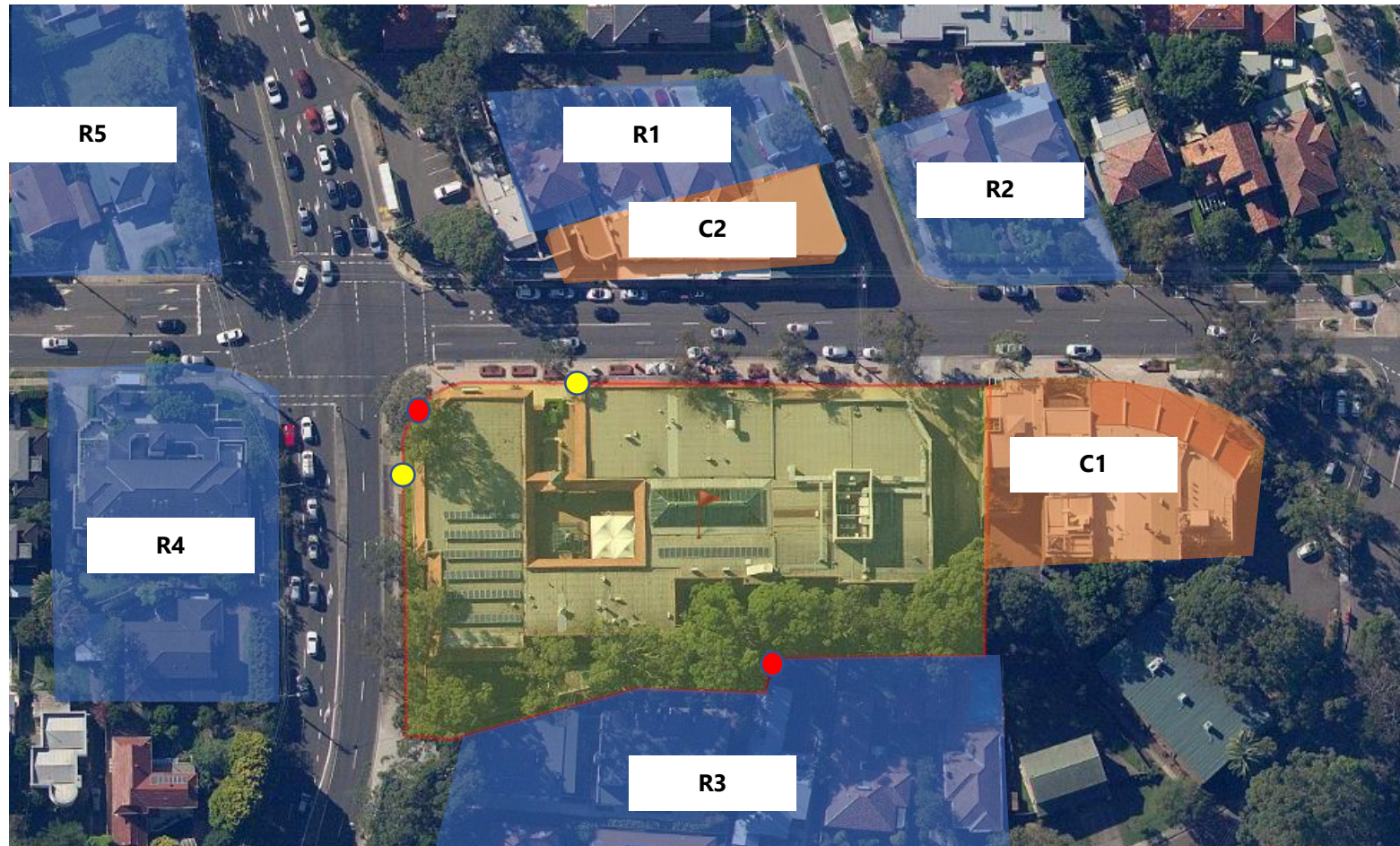


Figure 1 – Site Plan Showing Monitoring Locations and Surrounding Land Uses/Receivers

● - Unattended Noise Monitoring Location	■ - Residential
● - Attended Noise Monitoring Location	■ - Commercial
	■ - Site

3 PROPOSED CONSTRUCTION ACTIVITIES

This assessment is based upon the proposed construction activities associated with excavation, construction and internal Fitout works.

3.1 PROPOSED CONSTRUCTION STAGES

The information provided to this office of the primary noise producing activities associated with the site are as follows below:

- **Bulk Excavation (Approx. 5 Months):**
 - Excavation of basement parking levels and shoring works
 - Up to 10 heavy vehicle truck trips a day, up to 6 light vehicle trips a day.
 - The excavation will be bulk excavation in sandstone.
 - Detailed excavation and trenching once lowest basement RL is reached.
 - Excavation to be of depth 15m from the existing RL of the site.
 - Pneumatic/Hydraulic hammers to be used to remove sandstone
 - Concrete saws utilised to finish the basement walls
- **Structural works (Approx. 9 Months):**
 - Construction works internal to the site during this stage would include concrete pours of the basement and structural slabs, installation of structural elements for the proposed building
 - Use of electric tower crane.
 - Use of concrete trucks / boom. Anticipated that up to 10 concrete truck movements are expected in a given day and up to 28 light vehicle trips in a given day
 - Use of general hand tools and construction equipment, inclusive of grinders.
 - It is not expected that material handling / concrete truck uses occur for every day during this stage.
- **Fitout works (Approx. 11 Months):**
 - Use of general hand tools and construction equipment, inclusive of grinders.
 - Trucks and articulated vehicles to move materials and components. Anticipated that up to 20 heavy vehicle movements may occur in a given day for deliveries and up to 32 light vehicles.

4 HOURS OF WORK

Condition C6 of the preliminary project's SSDA development consent outlines the approved construction hours for works on site. The requirements of Condition C6 are reproduced below for reference.

"70. Hours of Work

All construction/demolition work relating to this Development Consent within the City, unless varied by an Out of Hours Work Permit, must be carried out only between the hours of 7 am to 5 pm Mondays to Fridays and 7 am to 12 noon on Saturdays. No work is permitted on Sundays or Public Holidays. "

Table 2 – Approved Hours of Work

Scope of Works	Approved Hours
All	Monday – Friday 7am – 5pm Saturday 7am – 12pm

5 AMBIENT NOISE SURVEY

This assessment makes reference to the unattended noise monitoring previously collated at the project site by this office as is presented within the approved DA Acoustic Assessment (ref. 20230424.1/0211A/R2/SJ) dated 2nd November 2023. The following table summarises the results of the unattended noise monitoring.

Table 3 – Background Noise Monitoring (Ref: 20230424.1/0211A/R2/SJ)

Applicable Receiver	Time Period	Measured Assessment Background Noise Level dB(A) L_{A90}
R3	Day 7am-6pm	42
R1, R2, R4, R5		60

6 NOISE AND VIBRATION MANAGEMENT LEVELS

Noise and vibration management levels have been derived for the project with reference to the requirements of the consent conditions listed within Section 3 of this document.

6.1 NOISE MANAGMENT LEVELS

6.1.1 EPA Interim Construction Noise Guideline

Given the scale of the proposed works, the “quantitative” assessment procedure, as outlined in the Interim Construction Noise Guideline (ICNG) will be used.

The quantitative assessment method requires:

- Determination of noise generation management levels (based on ambient noise monitoring).
- Prediction of operational noise levels at nearby development.
- If necessary, recommendation of noise controls strategies in the event that compliance with noise emission management levels is not possible.

6.1.1.1 Residential Receivers

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *“Noise affected” level.* Where construction noise is predicted to exceed the “noise effected” level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the “noise effected level”. For residential properties, the “noise effected” level occurs when construction noise exceeds ambient levels by more than 10dB(A) $L_{eq(15min)}$.
- *“Highly noise affected level”.* Where noise emissions are such that nearby properties are “highly noise effected”, noise controls such as respite periods should be considered. For residential properties, the “highly noise effected” level occurs when construction noise exceeds 75dB(A) $L_{eq(15min)}$ at nearby residences.

6.1.1.2 Commercial Receivers

"The external noise levels should be assessed at the most-affected occupied point of the premises:

- *Offices and retail outlets – External $L_{Aeq(15\text{ min})} = 70\text{ dB(A)}$."*

6.1.2 Summarised Construction Noise Management Levels

A summary is presented within the table below.

Table 4 – Noise Management Levels

Receiver Type	Receiver (Nearest to project Site)	Noise Management Level dB(A) $L_{eq(15\text{min})}$
Residential	R1, R2, R4, R5	<u>Noise Affected Level</u> - 70
		<u>Highly Noise Affected Level</u> – 75
	R3	<u>Noise Affected Level</u> - 52 <u>Highly Noise Affected Level</u> – 75
Commercial	C1	<u>Noise Affected Level</u> - 70

6.2 CONSTRUCTION VIBRATION REQUIREMENTS

Vibration control requirements for the nearest sensitive receivers will be based on the following documents:

- DIN 4150, 'Vibration in Buildings (1999-02).'
- EPA "Assessing Vibration: A technical guideline."
- El Australia Geotechnical Investigation, 100 Edinburgh Road, Castlecrag, dated 19th December 2023, ref. E26044.G03

6.2.1 DIN 4150

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in the table below.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 5 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

TYPE OF STRUCTURE		PEAK PARTICLE VELOCITY (mms ⁻¹)			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

6.2.2 Assessing Amenity

Table 2.2 of EPA "Assessing Vibration: A technical guideline" specified the following vibration goal for human comfort:

Table 6 – Preferred and Maximum Weighted RMS Values for Vibration Acceleration (m/s²) 1-80 Hz

Location	Assessment Period	Preferred Values Z-axis	Preferred Values X & Y-axis	Maximum Values Z-axis	Maximum Values X & Y-axis
Continuous Vibration					
Critical Areas	Day time	0.005	0.0036	0.010	0.0072
Residences	Day time	0.010	0.0071	0.020	0.014
Office	Day time	0.020	0.014	0.040	0.028
Impulsive Vibration					
Critical Areas	Day time	0.005	0.0036	0.010	0.0072
Residence	Day time	0.3	0.21	0.6	0.42
Office	Day time	0.64	0.46	1.28	0.92

Acceptable values for intermittent vibration shall comply with the requirements in Table 2.4 of EPA "Assessing Vibration: A technical guideline" detailed as below.

Table 7 - Acceptable Vibration Dose Values for Intermittent Vibration (m/s^{1.75})

Location	Day time preferred value	Day time maximum value
Critical Areas	0.10	0.20
Residences	0.20	0.40
Office	0.40	0.80

6.2.3 Summarised Recommended Vibration Limits

The summarised vibration criteria are presented in the table below.

Table 8 – Recommended Vibration Limits

Receiver	Recommended Vibration Limits
Residential – R1, R2, R3, R4 and R5	DIN 4150 Curve 2
Commercial – C1	DIN 4150 Curve 1

7 ACTIVITIES TO BE CONDUCTED AND THE ASSOCIATED NOISE SOURCES

Noise impacts will be determined from primary processes and equipment. The sound power levels of these activities are presented below.

Table 9 - Sound Power Levels of the Proposed Equipment

Stage	Equipment/Process	Sound Power Level dB(A)	Operational Load (% of 15-min period)
Excavation Stage	Excavator with Bucket Attachment	105	75
	Articulated Truck Movement	105	Assumed 1 in worst 15-minute period
	6t Excavator with Hydraulic Hammer Attachment (Medium Hammer)	115	75
	Concrete Saw	118	100
Construction and Fit Out Stage	Electric Tower Crane	95	25
	Power Drill	95	50
	Articulated Truck Movement	105	Assumed 1 in worst 15-minute period
	Concrete Trucks	108	Assumed 1 in worst 15-minute period
	Concrete Pumps	108	100
	General Hand Tools	95	100
	Angle Grinder*	105	50
	Generator	103	100
	Excavator with Bucket Attachment	105	75

*A tonality correction factor of 5dB(A) has been applied in line with the requirements of EPA documentation.

The noise levels presented in the above table are derived from the following sources, namely:

- Table A1 of Australian Standard 2436-2010.
- Data held by this office from other similar studies.

8 NOISE EMISSION ASSESSMENT

Stages listed within Section 3 of this document have been modelled to investigate the potential environmental impacts associated within the proposed works for the project.

SoundPlan Environmental Noise Modelling Software has been used to predict the impact of airborne noise from the construction works within the above scenarios on surrounding noise sensitive receivers, and this is detailed within the following section.

8.1 PREDICTED NOISE EMISSIONS

An assessment of the principal sources of noise emissions has been undertaken to identify the activities that may produce noise and/or vibration impacts so that appropriate ameliorative measures can be formulated. SoundPlan noise modelling has been conducted based on information provided to this office of construction methodology and activities likely to be undertaken and presents the cumulative predicted external noise levels to the nearest surrounding receivers.

Noise levels from construction works have been predicted at the nearby development and assessed against EPA the "Noise Management Level", as identified in section 6.

With regard to the noise level generated at the nearest receivers, noise levels will vary depending where on the construction site the work is undertaken. To address this, a range of predicted noise levels is provided. Predicted noise levels are presented below.

The predicted noise levels are based on the assumption that the recommendations in section 9 have been implemented/observed.

8.2 SOUNDPLAN MODELLING

Noise levels have been predicted at the receiver locations using SoundPlan™ 8.0 modelling software implementing the ISO 9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation" noise propagation standard.

Noise enhancing meteorological effects have been adopted as recommended by the NPfI, noting that the ISO 9613 modelling approach assumes that all receivers are 'downwind' (i.e., that noise enhancing wind and temperature inversion conditions are in effect at all times).

Ground absorption was conservatively calculated with a ground factor of 0 for all areas except for localised lawns and greenery with a ground factor of 0.6 as recommended in *Engineering Noise Control* (Bies & Hanson).

In line with Factsheet C of the NPfI, penalties for annoying noise characteristics should be applied at the receiver, where applicable. Based on the predicted noise levels, no penalty should be applied (either for tonality, intermittency, or otherwise).

Figure's 2 through 6, in conjunction with the façade noise levels provided within Appendix A of this document, present the results of the SoundPlan Noise modelling, and they are summarised in Table 9 below.

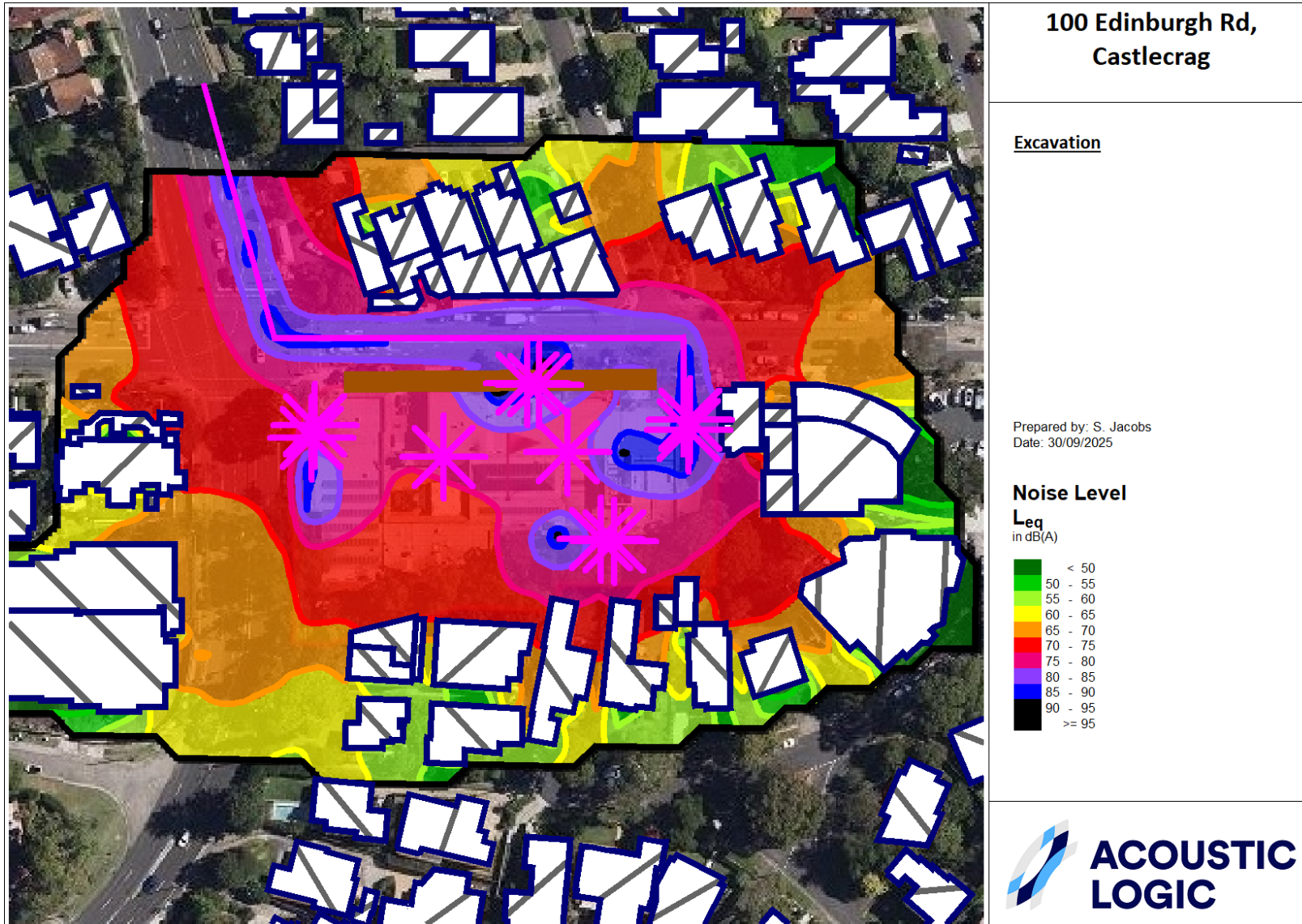


Figure 2 – Excavation Works

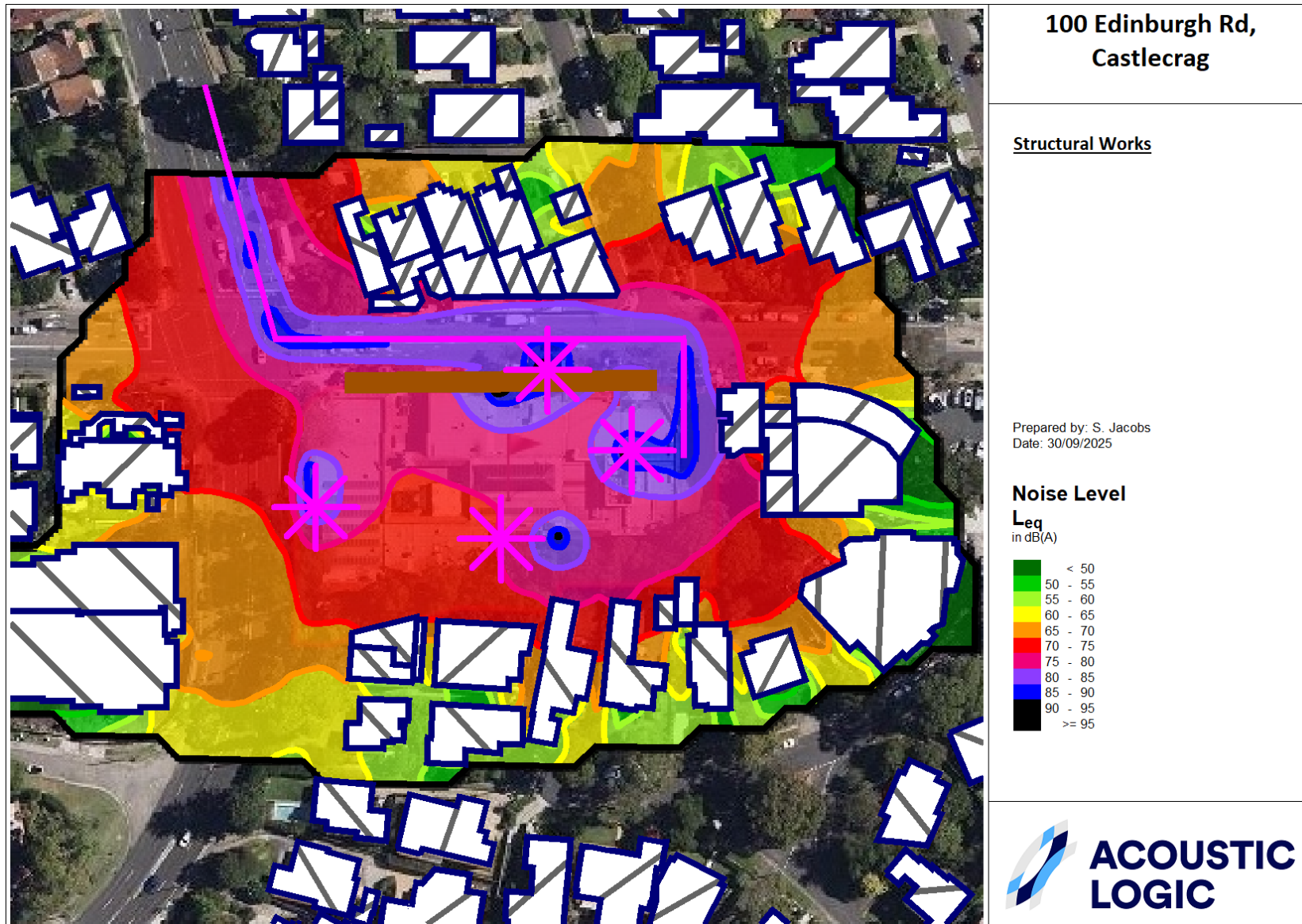


Figure 3 – Structural Works

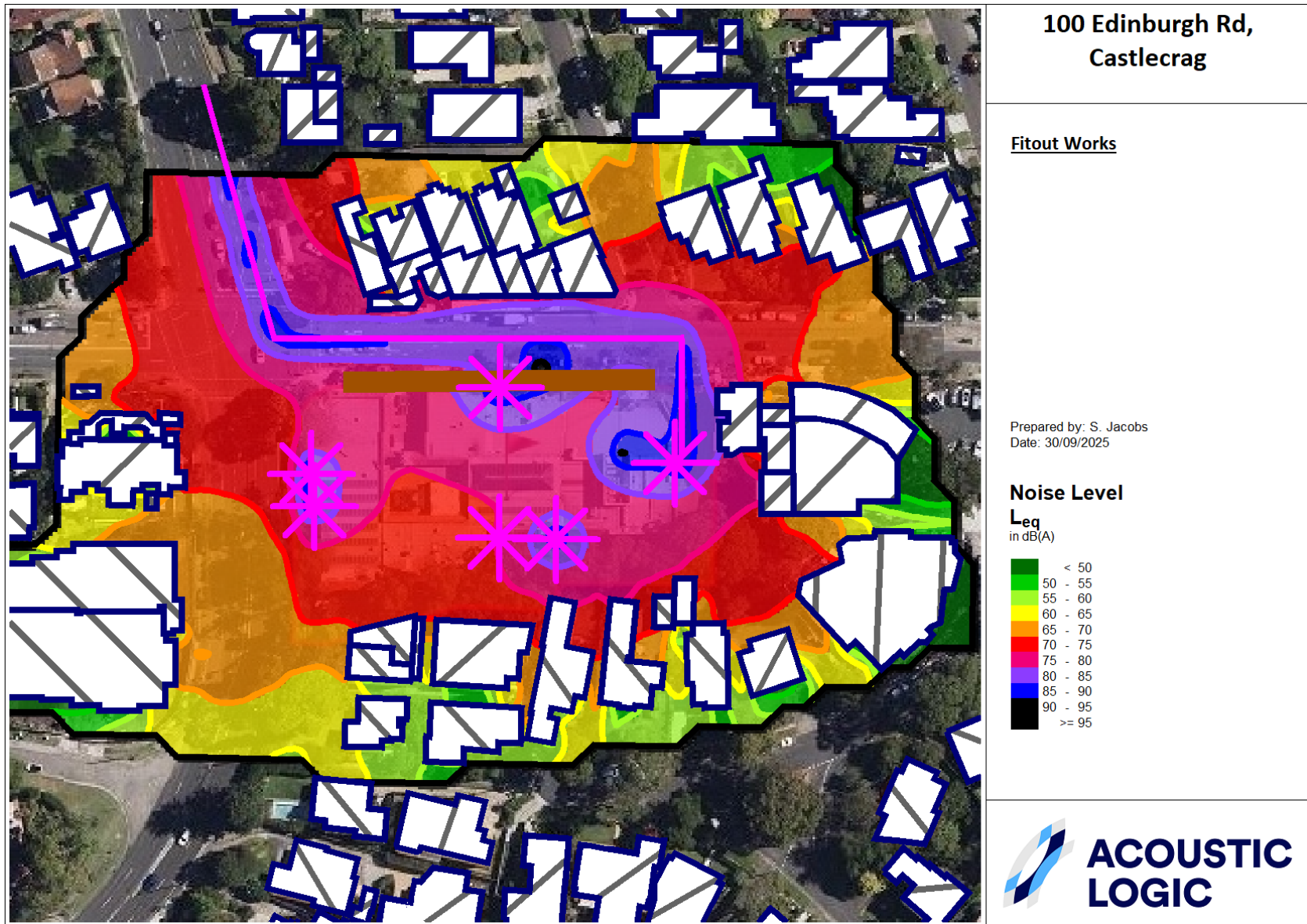


Figure 4 – Fitout Works

The predicted external and internal noise levels at nearest sensitive receivers are presented in the table below. Note that a façade correction of 30dB(A) has been applied for the respective internal noise levels for the various spaces, given that the façades of each receiver are fixed.

Table 10 –Predicted External Noise Levels at Nearest Sensitive Receivers

Receiver	Excavation Predicted External Noise Level dB(A) $L_{eq}(15min)$	Structural Predicted External Noise Level dB(A) $L_{eq}(15min)$	Fitout Predicted External Noise Level dB(A) $L_{eq}(15min)$	Affected Noise Level / Highly Affected Noise Level dB(A) $L_{eq}(15min)$	Comment
R1	<70	<70	<70	70/75	Works predicted to be below noise management levels.
R2	46-73	46-73	45-72		Potential to exceed Noise Management Level when working on closest boundaries, see Section 10 for recommendations. Works on further boundaries expected to comply.
R3	51-78	48-74	48-74	52/75	Potential to exceed Highly Affected Noise Management Level when working on closest boundary only, see Section 10 for recommendations. Works on further boundaries expected to comply.
R4	39-71	39-71	39-70	70/75	Potential to exceed Noise Management Level when working on closest boundaries, see Section 10 for recommendations. Works on further boundaries expected to comply.
R5	46-73	46-73	45-72		
C1	45-78	45-78	43-78	70/NA	Potential to exceed project noise management levels when working on closest boundary, refer to section 10 for recommendations. Works on further boundaries expected to comply.
C2	46-78	52-78	52-78		

9 AMELIORATIVE MEASURES

The following recommendations are made to mitigate the noise impacts of construction activity to surrounding sensitive receivers.

9.1 SITE SPECIFIC RECOMMENDATIONS

9.1.1 Barriers

The placement of barriers at the source is generally only effective for static plant. Placing barriers at the source cannot effectively attenuate equipment which is on the move or working in rough or undulating terrain.

The degree of noise reduction provided by barriers is dependent on the amount by which the line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15 dB(A) can be effected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8 dB(A) may be achieved. Where the barrier does not obstruct line of sight, generally no noise reduction will occur.

Barriers are used to provide shielding and do not act as an enclosure. The material they are constructed from should have a noise reduction performance which is approximately 10dB(A) greater than the maximum reduction provided by the barrier screening. In this case, the use of a material such as 15mm plywood (or equivalent material) would be acceptable for the barriers.

9.1.2 Site Notice

- A site notice(s) shall be prominently displayed at the boundaries of the Site for the purposes of informing the public of project details including, but not limited to the details of the Builder, Certifier and Structural Engineer. The notice(s) is to satisfy all but not be limited to, the following requirements:
 - The notice is to be able to be read by the general public;
 - The notice is to be rigid, durable and weatherproof and is to be displayed throughout the works period;
 - The approved hours of work, the name of the site/project manager, the responsible managing company (if any), its address and 24-hour contact phone number for any inquiries, including construction/noise complaint are to be displayed on the site notice; and
 - The notice(s) is to be mounted at eye level on the perimeter hoardings/fencing and is to state that unauthorised entry to the Site is not permitted.
- Hours of Work:
 - In line with the requirements of development consent, works are to Occur Monday-Friday 7am-5pm and 7am-12pm on Saturday.

9.1.3 Respite Periods

Respite periods are recommended to be used where plant may result in exceedances of the highly noise affected level to receivers, inclusive of the addition of 5dB to predicted levels to tonal/impulsive plant.

Where respite periods are nominated, it is recommended that works are undertaken in blocks not exceeding 4 hours each, with a minimum respite period of one hour between each block. 'Continuous' includes any period during which there is less than a 1-hour respite between ceasing and recommencing any of the work.

9.1.4 Noise Monitoring

As per the project's consent condition no.79 noise monitoring is to be conducted during high noise stage works to manage construction noise levels at receivers. Monitoring reports to be provided on a monthly basis as per the requirements of the condition. It is recommended that any noise monitor installed at the project site be installed at the project's southern boundary, as to assess the resultant noise impact on the closest, noise sensitive receivers (R3).

9.1.5 Other

- Vehicle Noise - Trucks should turn off their engines during idling to reduce impacts on nearby receivers (unless truck ignition needs to remain on during concrete pumping). Minimise truck reversing. Plant and equipment should be off when not in use.
- Deliveries should be scheduled during less sensitive time periods (After 9am) wherever practical.
- When selecting construction equipment to be used on the project, the noise levels of plant and equipment should be considered, whereby equipment selected has an equivalent or lower sound power level than the modelled sound power levels of equipment maintained within this report.
- A conscientious effort should be made to avoid works near the nearest sensitive receivers wherever feasible. Compounding various high generating activities simultaneously near receivers should be avoided where possible.
- Unnecessary shouting should be avoided on site, and appropriate signage should be installed to remind workers of their responsibility to reduce noise impacts where feasible. Loud music from radios and stereos should not be permitted.
- Materials should be placed gently and not thrown to avoid making crashing noises.
- During the fit-out stage and where practical and safe to do so, handheld construction equipment should be used within the building shell to minimise noise impacts on adjacent receivers.
- Non-tonal reversing beepers should be implemented on all construction equipment and mobile plant used regularly on site.
- In the event of a complaint, noise management procedure identified in Section 12 of this report are to be followed. Notwithstanding above, general management techniques and acoustic treatments are included below which may be implemented on a case-by-case basis to reduce noise emissions to surrounding receivers.

9.2 ASSESSMENT OF VIBRATION

9.2.1 Vibration Producing Activities

Proposed activities that have the potential to produce significant ground vibration include:

- Demolition Work.
- Excavation Work.
- Piling activities (Excluding auger rigs).
- Rolling activities.

9.2.2 Safeguards to Protect Sensitive Structures

It is impossible to predict the vibrations induced by the excavation operations on site at potentially affected receivers. This is because vibration levels are principally proportional to the energy impact which is unknown, the nature of the terrain in the area (type of soil), drop weight, height etc.

9.2.3 Vibration Monitoring

As per the project's geotechnical assessment vibration monitoring is to be conducted during excavation stage works to manage construction vibration levels at receivers. Any vibration monitor is to have SMS notification capability to enable contractor to be immediately informed when 75% of the vibration criteria has been measured.

Supplementary to this, and in line with the requirements of Condition 79 of the development consent, it is recommended that additional vibration monitoring be conducted where complaints arise from adjacent receivers, in order to ensure vibration levels are controlled to the levels nominated within Section 6 of this document.

9.2.4 Downloading of Vibration Monitor Data

Downloading of the vibration monitor data will be conducted on a regular basis. In the event of exceedance of the vibration criteria, downloading of the vibration monitor data will be conducted more frequently. Results obtained from the vibration monitor will be presented in a graph format and will be forwarded to the client for review. It is proposed that reports are provided fortnightly with any exceedances in the vibration criteria reported as detailed in this report.

9.2.5 Presentation of Vibration Monitor Results

A fortnightly report will be submitted to the client via email summarising the vibration events. The vibration exceedance of criteria is recorded, and the report shall be submitted within 24 hours. Complete results of the continuous vibration logging will be presented in fortnight reports including graphs of the collected data.

9.2.5.1 Equipment

Vibration monitoring at receiver facades or site boundaries are to be conducted using Texcel ETM type monitors with externally mounted tri-axial geophones.

The monitors are to be set to send an SMS message when alert levels have been reached/exceeded at the location of the geophone.

9.2.5.2 Vibration Monitoring Alerts

The following personnel will receive alarms in the event that the nominated vibration trigger levels are exceeded at the site:

1. Acoustic consultant/advisor.
2. Project site foreman.
3. Project Manager.

9.3 GENERAL RECOMMENDATIONS

Other noise management practices which may be adopted are discussed below. In addition, notification, reporting and complaints handling procedures should be adopted as recommended in later sections of this report.

9.3.1 Silencing Devices

Where construction process or appliances are noisy, the use of silencing devices may be possible. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

9.3.2 Material Handling

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

9.3.3 Treatment of Specific Equipment

In certain cases, it may be possible to specially treat a piece of equipment to reduce the sound levels emitted. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

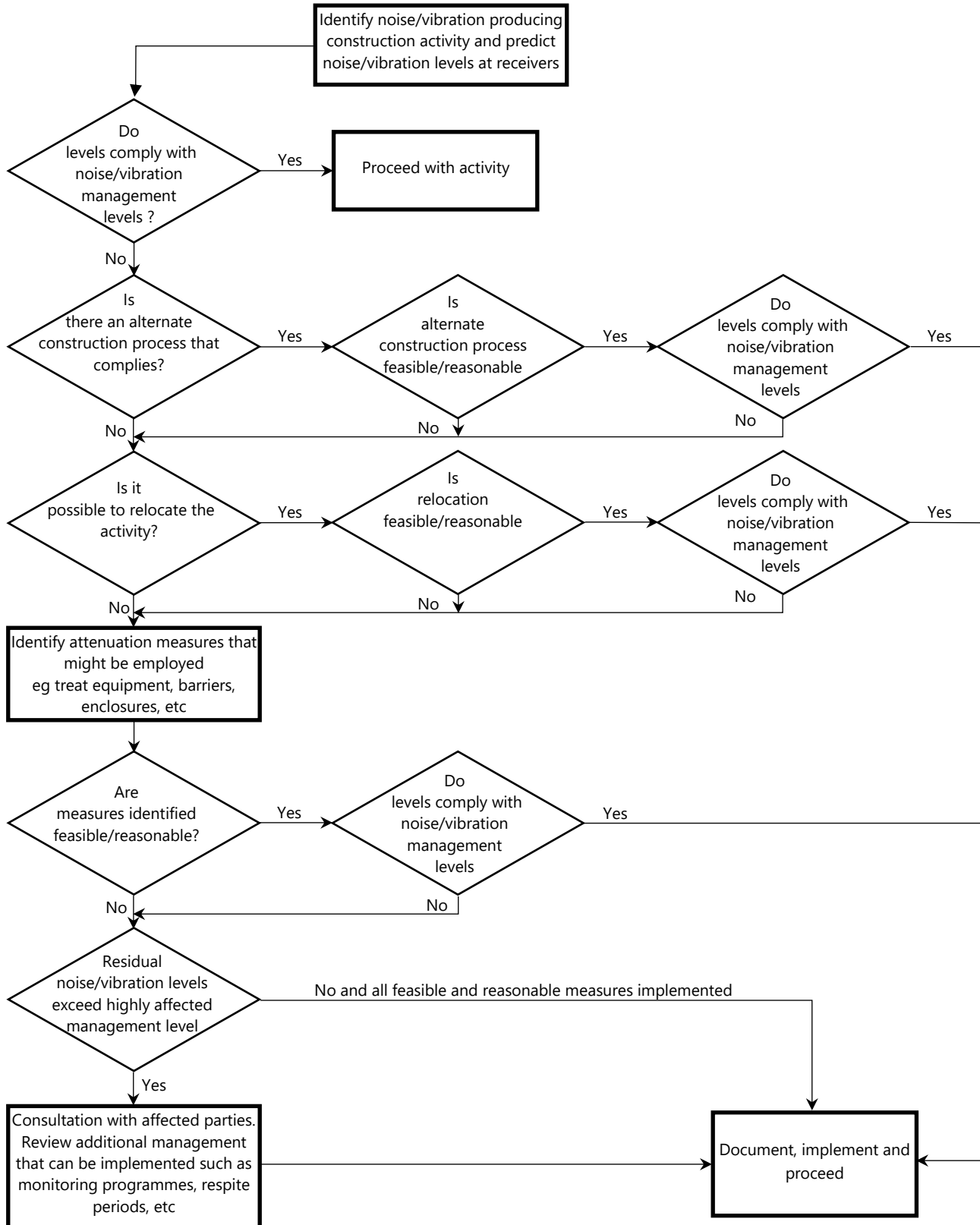
9.3.4 Establishment of Site Practices

This involves the formulation of work practices to reduce noise generation. This includes locating fixed plant items as far as possible from residents as well as rotating plant and equipment to provide respite to receivers. Construction vehicles accessing the site should not queue in residential streets and should only use the designated construction vehicle routes. Loading of these vehicles should occur as far as possible from any sensitive receiver.

10 ASSESSMENT METHODOLOGY AND MITIGATION METHODS

The flow chart that follows illustrates the process to be followed to minimise the impact associated with these activities.

Noise sources with the potential to exceed the criteria set out in Section 7 have been identified and discussed in section 8.



11 COMMUNITY INTERACTION AND COMPLAINTS HANDLING

11.1 ESTABLISHMENT OF DIRECT COMMUNICATION WITH AFFECTED PARTIES

In order for any construction noise management programme to work effectively, continuous communication is required between; all parties which may be potentially impacted upon, the builder and the regulatory authority. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation process is to:

- Inform and educate the groups about the project and the noise controls being implemented.
- Increase understanding of all acoustic issues related to the project and options available.
- Identify group concerns generated by the project, so that they can be addressed.
- Ensure that concerned individuals or groups are aware of and have access to the Site Complaints Register which will be used to address any construction noise related problems should they arise.

To ensure that this process is effective, regular scheduled meetings may be required for a finite period, until all issues have been addressed and the evidence of successful implementation is embraced by all parties.

An additional step in this process is to produce a newsletter informing nearby residents of upcoming activities that are likely to generate higher noise/vibration levels.

11.2 DEALING WITH COMPLAINTS

Should ongoing complaints of excessive noise, vibration or dust occur, immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices. In the case of exceedances of the vibration and dust limits, all work potentially producing vibration or dust shall cease until the exceedance is investigated. The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and address of the complainant (if provided).
- The time and date the complaint was received.
- The nature of the complaint and the time and date the noise was heard.
- The name of the employee who received the complaint.
- Actions taken to investigate the complaint, and a summary of the results of the investigation.
- Required remedial action, if required.
- Validation of the remedial action.
- If necessary, setup vibration monitoring at the location representing the nearest affected vibration receiver, with alarm device which can inform the project manager on site if the vibration exceedance happened.
- Summary of feedback to the complainant.

A permanent register of complaints should be held.

All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of a complaint shall involve where applicable:

- Noise measurements at the affected receiver.
- An investigation of the activities occurring at the time of the incident.
- Inspection of the activity to determine whether any undue noise is being emitted by equipment; and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.

Where an item of plant is found to be emitting excessive noise, the cause is to be rectified as soon as possible. Where work practices within established guidelines are found to result in excessive noise being generated then the guidelines should be modified so as to reduce noise emissions to acceptable levels. Where guidelines are not being followed, the additional training and counselling of employees should be carried out.

Measurement or other methods shall validate the results of any corrective actions arising from a complaint where applicable.

12 CONTINGENCY PLANS

Where non-compliances or noise complaints are raised the following methodology will be implemented.

1. Determine the offending plant/equipment/process
2. Locate the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implement additional acoustic treatment in the form of localised barriers, silencers etc where practical.
4. Selecting alternative equipment/processes where practical
5. If necessary, setup noise and vibration monitoring devices at locations representing the nearest noise/vibration and dust affected receivers and provide data for each complain time period. Analysis is required to determine suitable mitigation measures.

Complaints associated with noise and vibration generated by site activities shall be recorded on a Complaint Form. The person(s) responsible for complaint handling and contact details for receiving of complaints shall be established on site prior to construction works commencing. A sign shall be displayed at the site indicating the Site Manager to the general public and their contact telephone number.

13 CONCLUSION

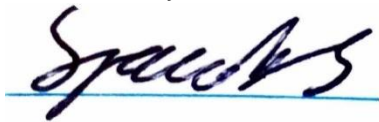
This report has been prepared to present a Construction Noise and Vibration Management Plan (CNVMP) for the mixed-use development to be located at 100 Edinburgh Road, Castlecrag.

This report has been prepared to address Willoughby City Council consent conditions 67, 68, 78 and 79 of the project's development consent (DA-2024/13), provided below for reference.

- Quantified background noise levels for sensitive receivers (see section 5),
- Reviewed the requirements of the ICNG (see section 6)
- Completed predictions and assessments of potential noise, ground-borne noise (as relevant) from the proposed construction methods expected at sensitive receivers against the objectives identified in the ICNG (see section 8),
- Reviewed noise mitigation measures that can be implemented to reduce construction noise and vibration (see section 9, 10 & 11),
- Noted measures that should be taken to identify non-conformances with the requirements of the CNVMP, procedures to implement corrective and preventative action and a complaints management system (See section 11).

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in blue ink, appearing to read 'Scott Jacobs', is written over a horizontal blue line.

Acoustic Logic Pty Ltd
Scott Jacobs