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# Proposed Modification to Function Room and Terrace Olympic Park Grandstand

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# Document Information

## Noise Assessment

Proposed Modification to Function Room and Terrace

Olympic Park Grandstand

3 Wilkinson Avenue, Muswellbrook, NSW

**Prepared for:** Barnson

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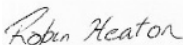


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# 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Barnson to prepare a Noise Assessment (NA) to quantify emissions from the proposed modification to the Function Room and Terrace redevelopment (the 'project') as part of the Olympic Park Grandstand upgrade in Muswellbrook, NSW.

The project includes the modification of the grandstand design which was approved as part of development application DA2022/95.

The NA has quantified potential operational and sleep disturbance noise emissions from the operation and recommends reasonable and feasible noise controls where required.

This assessment has been undertaken in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI) 2017;
- NSW Department of Environment and Climate Change (DECCW) – NSW Interim Construction Noise Guideline (ICNG), July 2009;
- NSW Department of Environment, Climate Change and Water (DECCW) – NSW Road Noise Policy (RNP), March 2011;
- NSW Environment Protection Authority (EPA), Approved methods for the measurement and analysis of environmental noise in NSW, 2022;
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures;
- International Organisation for Standardisation (ISO) 9613-1:1993 (ISO9613:1) - Acoustics - Attenuation of Sound During Propagation Outdoors - Part 1: Calculation of the Absorption of Sound by the Atmosphere;
- International Organisation for Standardisation (ISO) 9613-2:1996 (ISO9613:2) - Acoustics - Attenuation of Sound during Propagation Outdoors - Part 2: General Method of Calculation; and
- ISO/TR 17534-3 - Acoustics — Software for the calculation of sound outdoors — Part 3: Recommendations for quality assured implementation of ISO 9613-2 in software according to ISO 17534-1.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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## 2 Project Description

### 2.1 Background

The project is located on Wilkinson Avenue, in an area which is zoned RE1 for public recreation. The grandstand site is located approximately 500m southeast of Muswellbrook Town Centre and approximately 400m north of the New England Highway/Sydney Street. The site is bound to the northeast by an ARTC rail line, to the northwest by other sports venues, to the southeast by Bell Street and the southwest by residential dwellings. The main vehicular and pedestrian access to the grandstand is from the New England Highway, via Haydon Street and turning into Wilkinson Avenue. Pedestrian access to the project site can also be gained via Wilder Street from the New England Highway.

The grandstand site is part of Muswellbrook main sporting precinct which also includes Muswellbrook Aquatic Centre, tennis courts, bowls club, velodrome and community gardens. The nearest residential receivers in close proximity to the project site are located on Wilder Street, southwest of the project site. Additional residential receivers are located into the north across the rail line to the south across the highway and the west beyond the other sporting facilities. The project site and surrounding noise sensitive receivers are presented in **Figure 1**. The project includes the modification of the grandstand design which was approved as part of development application DA2022/95. The proposed changes to the approved design are presented in the plans included in **Appendix B** of this report. The modification will include design changes to the elements outlined in **Table 1**

**Table 1 Proposed Design Changes**

Level	Items
Ground Floor	<ul style="list-style-type: none"> <li>▪ Male, female and accessible changing rooms with water closets and showers;               <ul style="list-style-type: none"> <li>▪ Water closets;</li> <li>▪ Massage rooms;</li> <li>▪ Bar, canteen and kiosk;</li> <li>▪ Lobby area;</li> </ul> </li> <li>▪ Time keeper, admin, first aid and storerooms;</li> <li>▪ Strength training and warm up rooms;               <ul style="list-style-type: none"> <li>▪ Dry servery; and</li> </ul> </li> <li>▪ Referee rooms with water closets.</li> </ul>
Level 1	<ul style="list-style-type: none"> <li>▪ Terrace;</li> <li>▪ Function room;</li> <li>▪ Club/community spaces;               <ul style="list-style-type: none"> <li>▪ Kitchen;</li> <li>▪ Licensed Bar;</li> <li>▪ Water closets; and</li> </ul> </li> <li>▪ Comms Room and Storerooms.</li> </ul>
Level 2	<ul style="list-style-type: none"> <li>▪ Coaches Boxes; and</li> <li>▪ Media Room.</li> </ul>

The grandstand will host of the following noise generating events:

- sporting events; and
- function room events including corporate events, weddings, music performances.

## 2.2 Receiver Review

A review of residential receivers in proximity to the project has been completed and are summarised in **Table 2. Figure 1** provides a locality plan showing the position of these receivers in relation to the project.

Table 2 Receiver Locations				
Receiver	Receiver Type	Receiver Height	Coordinates (MGA56)	
			Easting	Northing
R01	Residential	1.5m	301376	6427676
R02	Residential	1.5m	301361	6427651
R03	Residential	1.5m	301378	6427612
R04	Residential	1.5m	301377	6427584
R05	Residential	1.5m	301398	6427559
R06	Residential	1.5m	301396	6427526
R07	Residential	1.5m	301425	6427503
R08	Residential	1.5/4.5m	301478	6427487
R09	Residential	1.5m	301523	6427495
R10	Residential	1.5m	301562	6427507
R11	Residential	1.5m	301781	6427778
R12	Residential	1.5m	301760	6427795
R13	Residential	1.5m	301744	6427803
R14	Residential	1.5m	301722	6427811
R15	Residential	1.5m	301704	6427832
R16	Residential	1.5m	301680	6427832
R17	Residential	1.5m	301671	6427834
R18	Residential	1.5m	301663	6427844
R19	Residential	1.5m	301649	6427849
R20	Residential	1.5m	301633	6427858
R21	Residential	1.5m	301613	6427865
R22	Residential	1.5m	301598	6427873
R23	Residential	1.5m	301583	6427879
AR01	Active Recreational	1.5m	301505	6427758
AR02	Active Recreational	1.5m	301444	6427798
AR03	Active Recreational	1.5m	301344	6427809
AR04	Active Recreational	1.5m	301457	6427690
C01	Commercial	1.5m	301632	6427507
I01	Industrial	1.5m	301528	6427856

## 2.3 Proposed Activities & Operating Hours

There are several key activities associated with the project that have the potential to generate acoustic impacts on nearby receivers. **Table 3** provides a summary of project noise sources and the assessment period in which they propose to occur.

Table 3 Noise Generating Activities		
Activity/Source	Period <sup>1</sup>	Operational
Mechanical Plant	Day	✓
	Evening	✓
	Night	✓
Patron Noise	Day	✓
	Evening	✓
	Night	✓
Internal Amplified Music Performance	Day	✓
	Evening	✓
	Night	✓

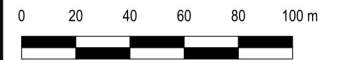
Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

**FIGURE 1**  
**Locality Plan**  
**MAC252414-02**  
**Muswellbrook Grandstand**



**KEY**

- Receiver
- Attended Noise Monitoring Location
- Unattended Noise Monitoring Location
- Site Boundary



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### 3 Noise Policy and Guidelines

#### 3.1 Noise Policy for Industry

The EPA released the Noise Policy for Industry (NPI) in October 2017 which provides a process for establishing noise criteria for consents and licenses enabling the EPA to regulate noise emissions from scheduled premises under the Protection of the Environment Operations Act 1997. The objectives of the NPI are to:

- provide noise criteria that is used to assess the change in both short term and long-term noise levels;
- provide a clear and consistent framework for assessing environmental noise impacts from industrial premises and industrial development proposals;
- promote the use of best-practice noise mitigation measures that are feasible and reasonable where potential impacts have been identified; and
- support a process to guide the determination of achievable noise limits for planning approvals and/or licences, considering the matters that must be considered under the relevant legislation (such as the economic and social benefits and impacts of industrial development).

The policy sets out a process for industrial noise management involving the following key steps:

1. Determine the Project Noise Trigger Levels (PNTLs) (ie criteria) for a development. These are the levels (criteria), above which noise management measures are required to be considered. They are derived by considering two factors: shorter-term intrusiveness due to changes in the noise environment; and maintaining the noise amenity of an area.
2. Predict or measure the noise levels produced by the development with regard to the presence of annoying noise characteristics and meteorological effects such as temperature inversions and wind.
3. Compare the predicted or measured noise level with the PNTL, assessing impacts and the need for noise mitigation and management measures.
4. Consider residual noise impacts - that is, where noise levels exceed the PNTLs after the application of feasible and reasonable noise mitigation measures. This may involve balancing economic, social and environmental costs and benefits from the proposed development against the noise impacts, including consultation with the affected community where impacts are expected to be significant.

5. Set statutory compliance levels that reflect the best achievable and agreed noise limits for the development.
6. Monitor and report environmental noise levels from the development.

### 3.1.1 Project Noise Trigger Levels (PNTL)

The policy sets out the procedure to determine the PNTLs relevant to an industrial development. The PNTL is the lower (ie, the more stringent) of the **Project Intrusiveness Noise Level (PINL)** and **Project Amenity Noise Level (PANL)** determined in accordance with Section 2.3 and Section 2.4 of the NPI.

### 3.1.2 Rating Background Level (RBL)

The Rating Background Level (RBL) is a parameter determined from noise monitoring and is used for assessment purposes. As per the NPI, the RBL is an overall single figure background level representing each assessment period (day, evening and night) over the noise monitoring period.

### 3.1.3 Project Intrusiveness Noise Level (PINL)

The PINL (LAeq(15min)) is the RBL + 5dB and seeks to limit the degree of change a new noise source introduces to an existing environment. Hence, when assessing intrusiveness, background noise levels need to be measured.

Background noise levels need to be determined before intrusive noise can be assessed. The NPI states that background noise levels to be measured are those that are present at the time of the noise assessment and without the subject development operating. For the assessment of modifications to existing premises, the noise from the existing premises should be excluded from background noise measurements. It is note that the exception is where the premises has been operating for a significant period of time and is considered a normal part of the acoustic environment; it may be included in the background noise assessment under the following circumstances:

- the development must have been operating for a period in excess of 10 years in the assessment period/s being considered and is considered a normal part of the acoustic environment; and,
- the development must be operating in accordance with noise limits and requirements imposed in a consent or licence and/or be applying best practice.

Where a project intrusiveness noise level has been derived in this way, the derived level applies for a period of 10 years to avoid continuous incremental increases in intrusiveness noise levels. This approach is consistent with the purpose of the intrusiveness noise level to limit significant change in the acoustic environment. The purpose of the project amenity noise level is to moderate against background noise creep.

### 3.1.4 Project Amenity Noise Level (PANL)

The PANL is relevant to a specific land use or locality. To limit continuing increases in intrusiveness levels, the ambient noise level within an area from all combined industrial sources should remain below the recommended amenity noise levels specified in Table 2.2 (of the NPI). The NPI defines two categories of amenity noise levels:

- **Amenity Noise Levels (ANL)** – are determined considering all current and future industrial noise within a receiver area; and
- **Project Amenity Noise Level (PANL)** – is the recommended level for a receiver area, specifically focusing the project being assessed.

Additionally, Section 2.4 of the NPI states: “to ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows”:

**PANL** for new industrial developments = recommended **ANL** minus 5dBA.

The following exceptions apply when deriving the PANL:

- areas with high traffic noise levels;
- proposed developments in major industrial clusters;
- existing industrial noise and cumulative industrial noise effects; and
- greenfield sites.

The NPI states with respect to high traffic noise areas:

*The level of transport noise, road traffic noise in particular, may be high enough to make noise from an industrial source effectively inaudible, even though the LAeq noise level from that industrial noise source may exceed the project amenity noise level. In such cases the project amenity noise level may be derived from the LAeq, period(traffic) minus 15 dB(A).*

Where relevant this assessment has considered influences of traffic with respect to amenity noise levels (ie areas where existing traffic noise levels are 10dB greater than the recommended amenity noise level).

Furthermore, Section 2.4 of the NPI states “where the project amenity noise level applies and it can be met, no additional consideration of cumulative industrial noise is required. “

The recommended amenity noise levels as per Table 2.2 of the NPI are reproduced in **Table 4**.

<b>Table 4 Amenity Noise Levels</b>			
Receiver Type	Noise Amenity Area	Time of day	Recommended amenity noise level dB LAeq(period)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks.	See column 4	See column 4	5dB above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School Classroom	All	Noisiest 1-hour period when in use	35 (internal) 45 (external)
Hospital ward			
- internal	All	Noisiest 1-hour	35
- external	All	Noisiest 1-hour	50
Place of worship			
- internal	All	When in use	40
Passive Recreation	All	When in use	50
Active Recreation	All	When in use	55
Commercial premises	All	When in use	65
Industrial	All	When in use	70

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

Note: The recommended amenity noise levels refer only to noise from industrial noise sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated.

Types of receivers are defined as rural residential; suburban residential; urban residential; industrial interface; commercial; industrial – see Table 2.3 and Section 2.7 of the NPI.

### 3.1.5 Maximum Noise Assessment Trigger Levels

The potential for sleep disturbance from maximum noise level events from a project during the night-time period needs to be considered. The NPI considers sleep disturbance to be both awakenings and disturbance to sleep stages.

Where night-time noise levels from a development/premises at a residential location exceed the following criteria, a detailed maximum noise level event assessment should be undertaken:

- $L_{Aeq}(15min)$  40dB or the prevailing RBL plus 5dBA, whichever is the greater, and/or
- $L_{Amax}$  52dB or the prevailing RBL plus 15dBA, whichever is the greater.

A detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Other factors that may be important in assessing the impacts on sleep disturbance include:

- how often the events would occur;
- the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the development;
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods); and
- current understanding of effects of maximum noise level events at night.

### 3.2 Noise Guide for Local Government (Disturbance)

The NSW Environment Protection Authority's (EPA) Noise Guide for Local Government (NGLG) published in January 2023 prior to the enactment of the Vibrancy Reforms, states that

*“three NSW public authorities have principal responsibility for regulating noise emitted by music venues: councils, the NSW Police Force, and Liquor and Gaming NSW (the State Government agency responsible for liquor licensing):*

*Council is the ARA for noise from musical instruments and amplified music that affects a residential neighbourhood unless the noise source is:*

*used on premises or for activities that require an EPA licence or for which the EPA is declared the ARA, or*

*part of activities carried on by the State or a public authority or an authorised network operator (see POEO Act, section 6). “*

The NGLG goes on to say – *“Liquor and Gaming NSW has a role in managing noise from licensed premises such as pubs, clubs and hotels (for loud music or patron noise). Following disturbance complaints, Liquor and Gaming NSW can impose noise conditions on licences in order to reduce noise impacts. Liquor and Gaming NSW is best positioned to investigate and respond to complaints about music and patron noise emitted from premises licensed under the Liquor Act.”*

The role of Liquor & Gaming NSW (L&G NSW) was further defined on the introduction of the NSW vibrancy reforms on 1 July 2024, as discussed in **Section 3.3**.

### 3.3 24-Hour Economy Legislation (Vibrancy Reforms) Amendment Act, 2023 (Cumulative)

The 24-Hour Economy Legislation (Vibrancy Reforms) Amendment Act, 2023, introduced by the New South Wales (NSW) Government, seeks to streamline and simplify regulations pertaining to noise, planning, and liquor licensing. The objective of the Vibrancy Reforms is to enhance the entertainment, economic, and creative potential of venues, particularly during night-time hours.

The Vibrancy Reforms designates Liquor & Gaming NSW as the lead regulator of entertainment and sound-related complaints for all licensed premises under the Liquor Act, 2007. Consequently, noise-related conditions specified in development consents and 'offensive noise pollution' laws will no longer be applicable when regulated by the Liquor Act, 2007.

To facilitate the effective execution of these reforms, Liquor & Gaming NSW will undergo amendments to the following relevant legislation:

- Gaming and Liquor Administration Act, 2007, No. 91;
- Liquor Act, 2007, No. 90;
- Liquor Regulation Act, 2018;
- Environmental Planning and Assessment Act, 1979, No. 203;
- Environmental Planning and Assessment Regulation, 2021;
- Local Government Act, 1993, No. 30; and
- Protection of the Environment Operations (General) Regulation, 2022.

For local government, the most relevant amendments are those in the EP&A Act; EP&A Regulation; and the PoEO Regulation, which rescinds development consent conditions relating to noise generated from licensed premises, trading hours of licensed premises and exempts licensed venues from noise pollution provisions contained in the PoEO Act including offensive noise laws.

Local councils are no longer the Appropriate Regulatory Authority (ARA) relating to matters of noise emitted from a licensed premises. This is affirmed in the NGLG which states “*The Liquor, Gaming and Racing Division of the Department of Customer Service administers the operation of liquor-licensed premises under the Liquor Act 2007, including handling noise complaints and setting noise conditions on licences.*”

Since the introduction of the Vibrancy Reforms on 1 July 2024, Liquor & Gaming NSW (L&G NSW) are the lead regulator in managing noise (disturbance) from licensed premises. As the regulator, L&G NSW have adopted a risk-based approach to disturbance noise issues from licensed premises. L&G NSW deal with noise complaints and statutory disturbance complaints relating to entertainment sound associated with licensed venues; lodged under the Liquor Act 2007.

Noise complaints and statutory disturbance complaints that L&G NSW **will consider** / include (noise related) matters relating to:

- Amplified and live music coming from the licensed premises;
- Use of speakers and PA systems for announcements;
- Other forms of entertainment, such as, karaoke, trivia, bingo, comedy and raffles;
- Patron noise coming from the licensed venue, including noise from patrons entering and exiting, talking, singing to music; and
- Patron behaviour when leaving a venue, including anti-social behaviour, yelling or swearing.

Noise complaints and statutory disturbance complaints that L&G NSW **will not consider** / include (noise related) matters relating to:

- Noise from waste disposal and collection, including recycling material;
- Noise from delivery services, such as food and liquor supplies, including loading and unloading operations;
- Mechanical and industrial noise including ventilation, air conditioners, kitchen exhaust fan systems and refrigeration units; and
- Noise from construction works.

L&G NSW suggest that a cumulative noise impact assessment of all noise sources at the premises be conducted to provide an indication of the potential for disturbance to community.

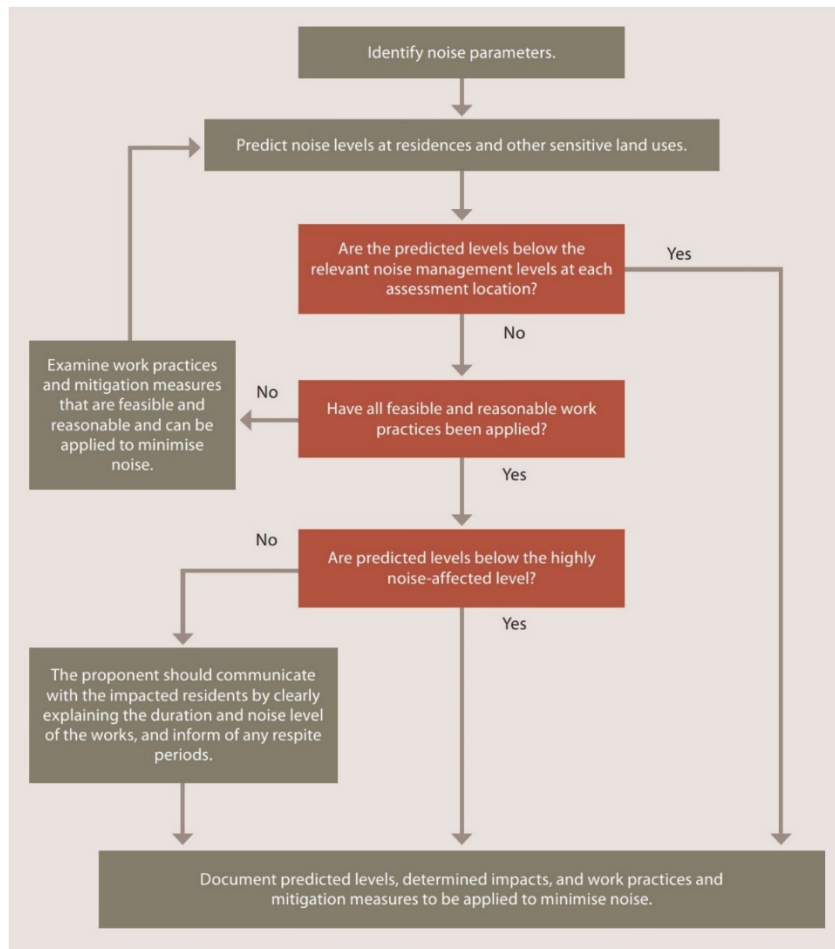
### 3.4 Interim Construction Noise Guideline

The ICNG sets out procedures to identify and address the impacts of construction noise on residences and other sensitive land uses. This section provides a summary of noise objectives that are applicable to the assessment. The ICNG provides two methodologies for the assessment of construction noise emissions:

- Quantitative, which is suited to major construction projects with typical durations of more than three weeks; and
- Qualitative, which is suited to short term infrastructure maintenance (< three weeks).

The qualitative assessment methodology is a more simplified approach that relies on noise management strategies. This NA has adopted a quantitative assessment approach which is summarised in **Figure 2**. The quantitative approach includes identification of potentially affected receivers, derivation of the construction noise management levels, quantification of potential noise impact at receivers via predictive modelling and, provides management and mitigation recommendations.

**Figure 2 Quantitative Assessment Processes for Assessing and Managing Construction Noise**



Source: Department of Environment and Climate Change, 2009.

### 3.4.1 Standard Hours for Construction

**Table 5** presents the ICNG recommended standard hours for construction works.

Table 5 Recommended Standard Hours for Construction	
Daytime	Construction Hours
Monday to Friday	7am to 6pm
Saturdays	8am to 1pm
Sundays or Public Holidays	No construction

These recommended hours do not apply in the event of direction from police, or other relevant authorities, for safety reasons or where required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm. Construction activities are anticipated to be undertaken during standard construction hours.

### 3.4.2 Construction Noise Management Levels

Section 4 of the ICNG details the quantitative assessment method involving predicting noise levels and comparing them with the Noise Management Level (NML) and are important indicators of the potential level of construction noise impact. **Table 6** reproduces the ICNG Noise Management Level (NML) for residential receivers. The NML is determined by adding 10dB (standard hours) or 5dB for Out of Hours (OOH) to the Rating Background Level (RBL) for each specific assessment period.

**Table 6 Noise Management Levels**

Time of Day	Management	
	Level LAeq(15min) <sup>1</sup>	How to Apply
Recommended standard hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or public holidays.	Noise affected RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise.  Where the predicted or measured LAeq(15min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.  The proponent should also inform all potentially impacted residents of the nature of work to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected 75dBA (HNA)	The highly noise affected level represents the point above which there may be strong community reaction to noise.  Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account times identified by the community when they are less sensitive to noise such as before and after school for work near schools, or mid-morning or mid-afternoon for work near residences; and if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours.	Noise affected RBL + 5dB	A strong justification would typically be required for work outside the recommended standard hours.  The proponent should apply all feasible and reasonable work practices to meet the noise affected level.  Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community.  For guidance on negotiating agreements see Section 7.2.2 of the ICNG.

Note 1: The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the construction noise management levels for noise assessment purposes and is the median of the ABL's.

### 3.4.3 Minimising Construction Noise

The ICNG outlines noise management and mitigation measures to minimise the noise impacts from construction activities on nearby sensitive receivers. Adopting the standard mitigation measures may result in an attenuation of up to 10dBA where space requirements place limitations on the attenuation options. Examples of standard mitigation measures are reproduced in **Table 7**, which may be adopted for the operation.

**Table 7 Standard Mitigation Measures**

	Action Required	Details
Management Measures	Implement community consultation or notification measures	<p>Notification detailing work activities, dates, and hours, impacts and mitigation measures, indication of work schedule over the night-time period, any operational noise benefits from the works (where applicable) and contact telephone number. Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required. Please contact Roads and Maritime Communication and Stakeholder Engagement for guidance:</p> <ul style="list-style-type: none"> <li>- website (If required);</li> <li>- contact telephone number for community;</li> <li>- email distribution list (if required); and/or</li> <li>- community drop-in session (if required by approval conditions).</li> </ul>
	Site Inductions	<p>All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include:</p> <ul style="list-style-type: none"> <li>- all relevant project specific and standard noise and vibration mitigation measures;</li> <li>- relevant licence and approval conditions;</li> <li>- permissible hours of work;</li> <li>- any limitations on noise generating activities;</li> <li>- location of nearest sensitive receivers;</li> <li>- construction employee parking areas;</li> <li>- designated loading/unloading areas and procedures;</li> <li>- site opening/closing times (including deliveries); and</li> <li>- environmental incident procedures.</li> </ul>
Site Controls	Minimise disturbance arising from delivery of goods to construction sites	<p>Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers.</p> <p>Select site access points and roads as far as possible away from sensitive receivers.</p> <p>Dedicated loading/unloading areas to be shielded if close to sensitive receivers.</p> <p>Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible.</p> <p>Avoid or minimise these out of hours movements where possible.</p>
	Shield stationary noise sources	<p>Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS2436:2010 lists materials suitable for shielding.</p>
Path Controls	Shield sensitive receivers from noise activities	<p>Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when siting plant.</p>

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## 4 Existing Environment

### 4.1 Unattended Noise Monitoring

To quantify the existing background noise environment of the area, unattended noise monitoring was conducted at one location representative of the ambient environment surrounding the project site. The selected monitoring location is shown in **Figure 1** and is considered representative of surrounding residential receivers as per Fact Sheet B1.1 of the NPI.

The unattended noise survey was conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics – Description and Measurement of Environmental Noise".

The measurements were carried out using one Svantek 977 noise analyser from Tuesday 12 August 2025 to Thursday 21 August 2025 the acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA. All equipment carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per the EPA's Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022). Data affected by adverse meteorological conditions have been excluded from the results in accordance with methodologies provided in Fact Sheet A4 of the NPI.

The results of long-term unattended noise monitoring are provided in **Table 8**. The noise monitoring charts, and a summary of the background monitoring data are provided in **Table C1** in **Appendix C**.

<b>Table 8 Background Noise Monitoring Summary</b>			
Monitoring Location	Period <sup>1</sup>	Measured Background	Measured
		Noise Level (LA90) dB RBL	dB LAeq
L1	Day	50	56
	Evening	51	55
	Night	51	54

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note: Excludes periods of wind or rain affected data. Meteorological data obtained from the Bureau of Meteorology weather station Singleton (Defence) AWS (32.69°S 151.16°E 125m AMSL).

Note: Calibration certificates of the sound level meters used for this project are available on request.

## 4.2 Attended Noise Monitoring

To supplement the unattended noise assessment and to quantify the changes in ambient noise in the community surrounding the operation, one 15 minute attended measurement was completed.

The attended noise survey was conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, “Acoustics – Description and Measurement of Environmental Noise”.

The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA. All equipment carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per the EPA’s Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022).

The attended noise monitoring was conducted using one Svantek 971 noise analyser at the site (see **Figure 1**) on Tuesday 12 August 2025 to quantify ambient background noise levels.

The attended measurement was completed during calm and clear meteorological conditions and confirmed that ambient traffic and commercial noise dominated the surrounding environment. The results of the short-term noise measurement and observations are summarised in **Table 9**.

Table 9 Operator-Attended Noise Survey Results					
Date/Time (hrs)	Noise Descriptor (dB re 20 $\mu$ Pa)			Meteorology	Description and SPL, dBA
	L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
12/08/2025 14:28				WD: NW	Traffic 45-72
	72	55	51	WS: 0.2m/s	Birds 48-58
				Rain: Nil	Creek Flowing 48-50

## 5 Assessment Criteria

### 5.1 Operational Project Noise Trigger Levels (Criteria)

This section outlines the determination of PNTLs and Maximum Noise Assessment Trigger Levels in accordance with NPI methodology.

#### 5.1.1 Project Intrusiveness Noise Levels

The PINL for the project are presented in **Table 10** and have been determined based on the RBL +5dBA and only apply to residential receivers.

Table 10 Project Intrusiveness Noise Levels					
Location	Receiver Type	Period <sup>1</sup>	Measured RBL	Adopted RBL	PINL
			dB LA90	dB LA90	dB LAeq(15min)
L1	Residential	Day	50	50	55
		Evening	51	50 <sup>2</sup>	55
		Night	51	50 <sup>2</sup>	55

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: As per NPI guidance the RBL for evening or night cannot be greater than the daytime RBL. Accordingly, the daytime RBL has been adopted for the evening and night period.

#### 5.1.2 Determination of NPI Residential Receiver Amenity Category

Classification of residential receivers in the surrounding area have been determined by review of the measured RBLs and a tally of the features for each category described in Table 2.3 of the NPI. The overall tally of features and resulting classifications are provided in **Table 11**. The detailed assessment of receiver categories is provided in **Appendix D**. This classification is used in conjunction with the intrusiveness criteria to determine the limiting criteria.

Table 11 Determination of NPI Residential Receiver Category			
Receiver/Location/Catchment	Rural	Suburban	Urban
L1	0	0	6

The detailed assessment of receiver categories indicates that the residential receivers surrounding the project site are representative of urban receivers.

### 5.1.3 Project Amenity Noise Levels

The relevant PANL for residential receivers and other receiver types (ie non-residential) potentially affected by the project are presented in **Table 12**.

Table 12 Project Amenity Noise Levels					
Receiver Type	Noise Amenity Area	Assessment Period <sup>1</sup>	Recommended ANL dB LAeq(period)	ANL dB LAeq(period) <sup>2</sup>	PANL dB LAeq(15min) <sup>3</sup>
Residential	Urban	Day	60	55	58
		Evening	50	45	48
		Night	45	40	43
Active Recreation		When in use	55	50	53
Commercial		When in use	65	60	63
Industrial		When in use	70	65	68

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: Project Amenity Noise Level equals the Amenity Noise Level -5dB as there is existing industry in the area.

Note 3: Includes a +3dB adjustment to the amenity period level to convert to a 15-minute assessment period as per Section 2.2 of the NPI.

### 5.1.4 Project Noise Trigger Levels

The PNTLs are the lower of either the PINLs or the PANLs. **Table 13** presents the derivation of the PNTLs in accordance with the methodologies outlined in the NPI.

Table 13 Project Noise Trigger Levels				
Catchment	Assessment Period <sup>1</sup>	PINL dB LAeq(15min)	PANL dB LAeq(15min)	PNTL dB LAeq(15min)
Residential Receivers	Day	55	58	55
	Evening	55	48	48
	Night	55	43	43
Active Recreation	When in use	N/A	53	53
Commercial	When in use	N/A	63	63
Industrial	When in use	N/A	68	68

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

### 5.1.5 Maximum Noise Trigger Levels

The maximum noise trigger levels shown in **Table 14** are based on nighttime RBLs and trigger levels as per Section 2.5 of the NPI. The trigger levels will be applied to transient noise events that have the potential to cause sleep disturbance.

<b>Table 14 Maximum Noise Trigger Levels (Night)</b>			
Residential Receivers			
LAeq(15min)		LAmix	
40dB LAeq(15min) or RBL + 5dB		52dB LAmix or RBL + 15dB	
Trigger	40	Trigger	52
RBL +5dB	55	RBL +15dB	65
<b>Highest</b>	<b>55</b>	<b>Highest</b>	<b>65</b>

Notes: Monday to Saturday; Night 10pm to 7am. On Sundays and Public Holidays Night 10pm to 8am.

NPI identifies that maximum of the two values is to be adopted which is shown in bold font.

### 5.2 L&G NSW Disturbance Assessment Criteria

To assess the potential for noise disturbance to the community, an assessment of emissions from performance/entertainment and patrons within the licensed premises has been completed. The level of disturbance has been established firstly by deriving an indicative disturbance criterion based on the background level (LA90) + 5dBA methodology (as per Section 2.3 of the NPI).

**Table 15** presents the Disturbance Criteria adopted for this assessment.

Location	Adopted background noise level			Disturbance Criteria dB LAeq(15min)		
	RBL, dB LA90			(Background +5dB)		
	Day	Evening	Night	Day	Evening	Night
L01	50	50	50	55	55	55

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

*Technical note: The disturbance assessment is an informal method adopted to indicate potential levels of community disturbance.*

Secondly, performance / entertainment and patrons noise emissions are subtracted from the Disturbance Criteria to establish the potential level for disturbance, as presented in **Table 16**. The greater the difference, the greater the likelihood of disturbance.

**Table 16 Potential for Disturbance and Significance of the Noise Emissions from the Project<sup>1</sup>**

Predicted Noise Level Minus Disturbance Criteria, dB LAeq(15min)	Potential for Disturbance
≤ 2dBA Increase	Negligible
≥ 3 but ≤ 5dBA Increase	Marginal <sup>2</sup> / Moderate <sup>3</sup>
>5dBA Increase	Moderate <sup>4</sup> / Significant

Note 1: Based off the Significance of Residual Noise Impacts from Table 4.1 of the NPI.

Note 2: If predicted noise level is less than the ambient LAeq (see Table 17).

Note 3: If predicted noise level is greater than the ambient LAeq (see Table 17).

Note 4: If predicted noise level is less or equal to the ambient LAeq (see Table 17).

### 5.3 Cumulative Noise Assessment Criteria

In consideration of these amendments resulting from the Vibrancy Reforms, a semi quantitative noise impact assessment has been conducted in lieu of (previously used) formalised criteria with reference to the methods and noise descriptors described / defined in the NPI and NGLG. To quantify the potential for the project to disrupt the quiet and good order of the surrounding area, noise emissions from cumulative whole site operation (entertainment and operations) are assessed against the existing ambient noise levels. The existing LAeq noise levels are reproduced in **Table 17**.

**Table 17 Existing Ambient Noise Levels**

Monitoring Location	Measured Existing Ambient Noise Level dB LAeq		
	Day	Evening	Night
L1	56	55	54

Note 1: Day – the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening – the period from 6pm to 10pm; Night – the remaining periods.

### 5.4 Construction Noise Management Levels

The relevant Noise Management Levels (NMLs) for standard construction hours are presented in **Table 18**.

**Table 18 Construction Noise Management Levels**

Receiver Type	Assessment Period <sup>1</sup>	Adopted RBL	NML
		dB LA90	dB LAeq(15min)
Residential	Standard Hours	50	60 (RBL+10dBA)
Active Recreation Areas	When in use	N/A	65 (external)
Commercial Premises	When in use	N/A	70 (external)
Industrial	When in use	N/A	75 (external)

Note 1: See Table 2 for Standard Recommended Hours for Construction.

## 6 Modelling Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2024) noise modelling software. iNoise is an intuitive and quality assured software for industrial noise calculations in the environment. 3D noise modelling is considered industry best practice for assessing noise emissions from projects.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers. Where relevant, modifying factors in accordance with Fact Sheet C of the NPI have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613:1 and ISO 9613:2 including corrections for meteorological conditions using CONCAWE<sup>1</sup>. The ISO 9613 standards are the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

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<sup>1</sup> Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981

## 6.1 Modelled Sound Power Levels

The sound power data for the project were referenced from manufacturer specifications and MAC noise source database for similar developments. The sound power levels for noise sources adopted in this assessment are summarised in **Table 19**.

<b>Table 19 Acoustically Significant Sources – Sound Power Levels (re 10<sup>-12</sup> Watts)</b>			
Item and number modelled per 15 minutes	Individual Sound Power Level, dB LAeq(15min)	Total Source Sound Power Level, dB LAeq(15min)	Source Height <sup>1</sup>
<b>Operation</b>			
AC Plant (x2)	69	72	1.0m
AC Plant (x9)	64	74	1.0m
AC Plant (x3)	76	81	1.0m
Rooftop Extractor Fan (x3)	62	67	1.0m
Rooftop Extractor Fan (x5)	63	70	1.0m
Rooftop Extractor Fan (x1)	73	73	1.0m
Rooftop Extractor Fan (x1)	79	79	1.0m
Rooftop Extractor Fan (x)	77	77	1.0m
Rooftop Extractor Fan (x2)	69	72	1.0m
Rooftop Extractor Fan (x1)	64	64	1.0m
Rooftop Extractor Fan (x4)	66	72	1.0m
Rooftop Extractor Fan (x1)	65	65	1.0m
Rooftop Extractor Fan (x1)	68	68	1.0m
<b>Sleep disturbance assessment (LAmax), Night-time periods (10pm to 7am)</b>			
Car Door Slam		85	0.5m
Patron Yelling		92	1.5m
<b>Disturbance Assessment</b>			
Internal Entertainment Sound (x1) <sup>3</sup>	100	100	1.5m
325 Patrons on Grandstand –Vocal Effort (all talking simultaneously) <sup>4</sup>	89	89	3m
325 Patrons on Terrace –Vocal Effort (all talking simultaneously) <sup>4</sup>	89	89	1.5m
<b>Construction Assessment</b>			
Combined Construction Fleet	108	108	1.5m

Note 1: Height of source relative to item below.

Note 2: Source - MAC database.

Note 3: Source Association of Australasian Acoustical Consultants (AAAC) - Licensed Premises Noise Assessment Technical Guideline Version 2.0, 2020.

Note 4: Source M Hayne et al – Prediction of Noise from Small to Medium Sized Crowds – AAS Paper Number 133 presented at AAS Conference November 2011.

Note 5: Includes a duration adjustment assuming vehicles operate for three (3) minutes continuously within a period of 15-minutes.

A cumulative scenario including all operational and disturbance assessment noise sources has also been included in this assessment for completeness.

## 6.2 Mitigation Included in Design and Noise Control Recommendations

The noise model incorporated the following recommendations and noise controls:

- the project is constructed as per the site design and plans (as presented in **Appendix B**) which includes the attenuation provided by the project building and / or its orientation;
- the mechanical air conditioning and ventilation plant are located in various positions around the project site as per the site design and plans (as presented in **Appendix B**);
- 325 patrons are assumed to occupy the grandstand area, with 325 patrons on the terrace area are during peak periods;
- 150 patrons are assumed to occupy the internal function area during peak periods with the doors remaining open; and
- entertainment noise generating activities are undertaken in the internal function area with the doors remaining open.

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## 7 Assessment Results

This assessment has quantified operational and licensed venue noise levels at the nearest receivers.

### 7.1 Operational Noise Assessment

Noise predictions from all operational noise sources have been quantified at surrounding receivers. The coincidence of all plant occurring onsite simultaneously for an entire 15-minute period is unlikely. However, it is probable that several plant may operate simultaneously on occasion for a limited duration. To account for this, modelling has adopted the  $L_{Aeq}(15min)$  contribution of sources which were derived from manufacturer's specifications or from in-field measurements of proposal sources or activities. Results of the noise modelling predictions are presented in **Table 20** for onsite activities during all periods.

**Table 20 Operational Noise Predictions – All Receivers**

Residential Receivers							
Receiver	Predicted Noise Level			PNTL			Compliant
	dB LAeq(15min)			dB LAeq(15min)			
	Day	Evening	Night	Day	Evening	Night	
R01	<35	<35	<35	55	48	43	✓
R02	<35	<35	<35	55	48	43	✓
R03	<35	<35	<35	55	48	43	✓
R04	<35	<35	<35	55	48	43	✓
R05	<35	<35	<35	55	48	43	✓
R06	<35	<35	<35	55	48	43	✓
R07	<35	<35	<35	55	48	43	✓
R08	<35	<35	<35	55	48	43	✓
R09	<35	<35	<35	55	48	43	✓
R10	<35	<35	<35	55	48	43	✓
R11	<35	<35	<35	55	48	43	✓
R12	<35	<35	<35	55	48	43	✓
R13	<35	<35	<35	55	48	43	✓
R14	<35	<35	<35	55	48	43	✓
R15	<35	<35	<35	55	48	43	✓
R16	<35	<35	<35	55	48	43	✓
R17	<35	<35	<35	55	48	43	✓
R18	<35	<35	<35	55	48	43	✓
R19	<35	<35	<35	55	48	43	✓
R20	<35	<35	<35	55	48	43	✓
R21	<35	<35	<35	55	48	43	✓
R22	<35	<35	<35	55	48	43	✓
R23	<35	<35	<35	55	48	43	✓
Other Receivers							
Receiver	Period	Predicted Noise Level		PNTL		Compliant	
		dB LAeq(15min)		dB LAeq(15min)			
AR01	When in use	<35		53		✓	
AR02	When in use	<35		53		✓	
AR03	When in use	37		53		✓	
AR04	When in use	<35		53		✓	
C01	When in use	<35		63		✓	
I01	When in use	<35		68		✓	

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

## 7.2 Maximum Noise Level Assessment

In assessing maximum noise events, typical L<sub>Amax</sub> noise levels from transient events in the loading area were assessed at the nearest residential receivers. For the sleep disturbance assessment, a Sound Power Level of 87dBA for a door slam and 92dBA for a patron yell were adopted for maximum noise level (L<sub>Amax</sub>) events during the night period. Predicted noise levels from L<sub>Amax</sub> events for assessed receivers are presented in **Table 21** for the night period.

Table 21 Maximum Noise Level Assessment (Night) <sup>1</sup>						
Rec	Predicted Noise Level				Trigger Level	
	dB L <sub>Amax</sub>				NPI	Compliant
	Door Slam Northern Facade	Door Slam Southern Facade	Patron Shout at Southern End of Terrace	Patron Shout at Northern End of Terrace		
R01	<35	<35	37	<35	65	✓
R02	<35	<35	36	<35	65	✓
R03	<35	<35	36	<35	65	✓
R04	<35	<35	<35	<35	65	✓
R05	<35	<35	<35	<35	65	✓
R06	<35	<35	<35	<35	65	✓
R07	<35	<35	<35	<35	65	✓
R08	<35	<35	<35	<35	65	✓
R09	<35	<35	<35	<35	65	✓
R10	<35	<35	<35	<35	65	✓
R11	<35	<35	<35	<35	65	✓
R12	<35	<35	<35	<35	65	✓
R13	<35	<35	<35	<35	65	✓
R14	<35	<35	<35	<35	65	✓
R15	<35	<35	<35	<35	65	✓
R16	<35	<35	<35	<35	65	✓
R17	<35	<35	<35	35	65	✓
R18	<35	<35	<35	35	65	✓
R19	<35	<35	<35	36	65	✓
R20	<35	<35	<35	36	65	✓
R21	<35	<35	37	<35	65	✓
R22	<35	<35	36	<35	65	✓
R23	<35	<35	36	<35	65	✓

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

The predicted maximum levels results demonstrate compliance with the maximum noise trigger levels for patron yells and door slams at the project site during the night.

### 7.3 Disturbance Assessment Results

Results of the disturbance assessment addressing patron noise and amplified music performance occurring at the project site following the implementation of noise controls and assumptions in **Section 6.2** are presented in **Table 22**. It is assumed that entertainment and patron noise may continue post 10pm therefore predicted noise levels are compared against the most conservative night criteria.

Table 22 L&G Disturbance Assessment Results				
Receiver	Predicted Noise	Nighttime	Predicted Noise Level	Characterisation of impacts
	Level	Disturbance Criteria	Minus Disturbance Criteria	
	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)	
R01	<35	55	<0dBA	Negligible
R02	<35	55	<0dBA	Negligible
R03	<35	55	<0dBA	Negligible
R04	<35	55	<0dBA	Negligible
R05	<35	55	<0dBA	Negligible
R06	<35	55	<0dBA	Negligible
R07	<35	55	<0dBA	Negligible
R08	<35	55	<0dBA	Negligible
R09	<35	55	<0dBA	Negligible
R10	<35	55	<0dBA	Negligible
R11	<35	55	<0dBA	Negligible
R12	<35	55	<0dBA	Negligible
R13	<35	55	<0dBA	Negligible
R14	<35	55	<0dBA	Negligible
R15	<35	55	<0dBA	Negligible
R16	<35	55	<0dBA	Negligible
R17	<35	55	<0dBA	Negligible
R18	<35	55	<0dBA	Negligible
R19	<35	55	<0dBA	Negligible
R20	<35	55	<0dBA	Negligible
R21	<35	55	<0dBA	Negligible
R22	<35	55	<0dBA	Negligible
R23	<35	55	<0dBA	Negligible

Predicted noise levels were calculated to be below the Disturbance Criteria and therefore impacts are negligible.

## 7.4 Cumulative Assessment Results

Results of the cumulative scenario assessing vehicles, patrons and venue entertainment occurring externally at the project site during the most conservative night period and inclusive of the noise controls and assumptions in **Section 6.2** are presented in **Table 23**.

**Table 23 Cumulative Assessment Results**

Predictive Levels				
Receiver	Predicted Noise Level dB LAeq(15min)	Existing Ambient Noise Level dB LAeq(night) <sup>1</sup>	Total Noise Level dB LAeq(15min)	Increase dBA
R01	<35	54	54	<0dBA
R02	<35	54	54	<0dBA
R03	<35	54	54	<0dBA
R04	<35	54	54	<0dBA
R05	<35	54	54	<0dBA
R06	<35	54	54	<0dBA
R07	<35	54	54	<0dBA
R08	<35	54	54	<0dBA
R09	<35	54	54	<0dBA
R10	<35	54	54	<0dBA
R11	<35	54	54	<0dBA
R12	<35	54	54	<0dBA
R13	<35	54	54	<0dBA
R14	<35	54	54	<0dBA
R15	<35	54	54	<0dBA
R16	<35	54	54	<0dBA
R17	<35	54	54	<0dBA
R18	<35	54	54	<0dBA
R19	<35	54	54	<0dBA
R20	<35	54	54	<0dBA
R21	<35	54	54	<0dBA
R22	<35	54	54	<0dBA
R23	<35	54	54	<0dBA

Note 1: Refer to Unattended Noise Monitoring in Section 7.2.

Results of the predictive noise modelling show that noise levels associated with the project are significantly below existing nighttime ambient noise levels. Therefore, noise emissions from the project are not expected to increase the existing ambient noise levels and have a negligible influence on the existing acoustic environment. Notwithstanding this, management controls in **Section 8** should be considered and implemented where necessary.

## 7.5 Construction Noise Assessment

**Table 24** presents the results of modelled construction noise emissions taking into account the additional 10dB attenuation provided by standard mitigation measures. Predictions identify that emissions from construction would remain below the Construction NMLs at all the assessed receivers with the inclusion of standard mitigation measures.

Table 24 Construction Noise Levels – All Receivers				
Receiver	Period <sup>1</sup>	Predicted Noise Level	Management Level	Compliant
		dB LAeq(15min)	dB LAeq(15min)	
R01	Day	42	60	✓
R02	Day	40	60	✓
R03	Day	40	60	✓
R04	Day	39	60	✓
R05	Day	38	60	✓
R06	Day	37	60	✓
R07	Day	37	60	✓
R08	Day	37	60	✓
R09	Day	37	60	✓
R10	Day	38	60	✓
R11	Day	36	60	✓
R12	Day	37	60	✓
R13	Day	37	60	✓
R14	Day	<35	60	✓
R15	Day	38	60	✓
R16	Day	39	60	✓
R17	Day	40	60	✓
R18	Day	40	60	✓
R19	Day	40	60	✓
R20	Day	40	60	✓
R21	Day	55	60	✓
R22	Day	45	60	✓
R23	Day	39	60	✓
AR01	Day	49	65	✓
AR02	Day	37	65	✓
AR03	Day	43	65	✓
AR04	Day	42	65	✓
C01	Day	40	70	✓
I01	Day	40	75	✓

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 1pm on Sundays and public holidays.

## 8 Licensed Premises Noise Mitigation and Management Measures

The results of the assessment identify that levels are generally calculated to be below the adopted disturbance criteria at surrounding residential receivers to the project. Notwithstanding, to further protect the quiet and good order of neighbourhood, it is recommended that noise management and mitigation measures be adopted where practicable.

### 8.1.1 Practical Tips to Manage Noise Emissions<sup>2</sup>

- Remind patrons leaving your venue to do so quickly and quietly to mitigate instances of anti-social behaviour and install signage at all egress points requesting patrons leaving your venue do so quickly and quietly (e.g. no loitering);
- Encourage the gradual dispersal of patrons leaving your venue to assist in crowd control (e.g. by closing certain areas of your venue or reducing the level/volume of entertainment or music during the later part of the trading period);
- Where required utilise security to assist in patron egress and management to ensure patrons leaving your venue do not loiter in the immediate vicinity and cause disturbance to the neighbourhood;
- Actively promote and display information about nearby public transport services that are available, or ride share pick up/drop off zones;
- Establish an internal complaint handling process, including maintaining a register of disturbance complaints received and any steps or actions taken to address them;
- Provide a contact number and link on your venue's website for enquiries and complaints, and ensure the number is actively monitored;
- Set clear expectations and communicate operating procedures with staff members, including procedures relating to the provision of entertainment and noise mitigation controls. These internal policies and procedures can be set out in a Plan of Management;
- Train staff in handling incoming calls or complaints regarding noise, including during times where a licensee may not be on duty;
- Notify local residents of upcoming entertainment and live music events through your venue's website and/or via letter drop;

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<sup>2</sup> Source: Sound Management Guidance for licensed venue operators, NSW Government, 2024.

- Initiate community meetings to discuss any disturbance issues and build good relationships with your local community;
- Attend local liquor accord meetings; and
- Monitor responsible service of alcohol practices at your venue. These strategies may also be included in a Plan of Management.

### 8.1.2 Acoustic Guidance and Mitigation Strategies

- Consider the type of entertainment provided, and the frequency and timing of any entertainment programming hosted at your venue;
- Consider the placement of amplifiers, speakers, band instruments, or stage set up within your venue and be mindful of locating such equipment near windows and doors or on surfaces through which sound or vibration may travel into adjoining residences or businesses;
- Consider re-directing the angle of speakers to minimise noise leakage from your venue and reverberation impacts;
- Conduct regular perimeter checks and monitor sound levels at the boundary of your venue and any neighbouring residences;
- Consider lowering the volume of any amplified speakers or PA system in use at your venue, particularly during later trading periods;
- Consider closing doors and windows when amplified music and entertainment is hosted at your venue, particularly those facing residential areas and during late trading periods;
- Limit the use of speakers or hosting amplified entertainment in outdoor areas after certain times or during late trading periods;
- Engage an accredited acoustic engineer to undertake acoustic testing at your venue and consider implementing any acoustic recommendations, if appropriate;
- Consider installing soundproofing and sound attenuation materials at your venue, such as sound absorbing insulation within walls, floors and ceiling, double-glazing windows, installing sound dampening curtains or acoustic seals on windows and doors; and
- Prepare and adopt a noise management plan.

## 9 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Assessment (NA) to quantify emissions from the proposed modification to the Function Room and Terrace redevelopment (the 'project') as part of the Olympic Park Grandstand upgrade in Muswellbrook, NSW . The assessment has quantified licensed venue entertainment sources such as amplified performance, and patron noise as well as potential operation emissions pertaining to mechanical plant. The noise assessment assumed the recommended noise controls for the project are implemented (see **Section 6.2**):

- the project is constructed as per the site design and plans (as presented in **Appendix B**) which includes the attenuation provided by the project building and / or its orientation;
- the mechanical air conditioning and ventilation plant are located in various positions around the project site as per the site design and plans (as presented in **Appendix B**);
- 325 patrons are assumed to occupy the grandstand area, with 325 patrons on the terrace area are during peak periods;
- 150 patrons are assumed to occupy the internal function area during peak periods with the doors remaining open; and
- entertainment noise generating activities are undertaken in the internal function area with the doors remaining open.

The results of the Operational and Maximum Noise Level Assessments demonstrate that noise emissions from the project would satisfy the relevant PNTLs at all assessed receivers for all assessment periods.

Sources considered as part of the disturbance assessment included patron noise and live entertainment noise. Noise emissions associated with these sources are predicted to have negligible disturbance on the surrounding noise environment.

Sources for the cumulative noise assessment including mechanical plant, onsite light vehicles, patron noise and live entertainment that are predicted to are not expected to influence existing ambient noise environment. Notwithstanding, it is recommended that the project consider management controls within **Section 8** to manage potential disturbances on surrounding residential receivers.

Modelled noise emissions from construction activities identify that predicted noise emissions will satisfy the applicable construction noise management levels at all receivers taking into account standard mitigation measures (see **Table 7**).

In summary, the Noise Assessment supports the Development Application for the project incorporating the recommendations and controls outlined in this report.

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# Appendix A – Glossary of Terms

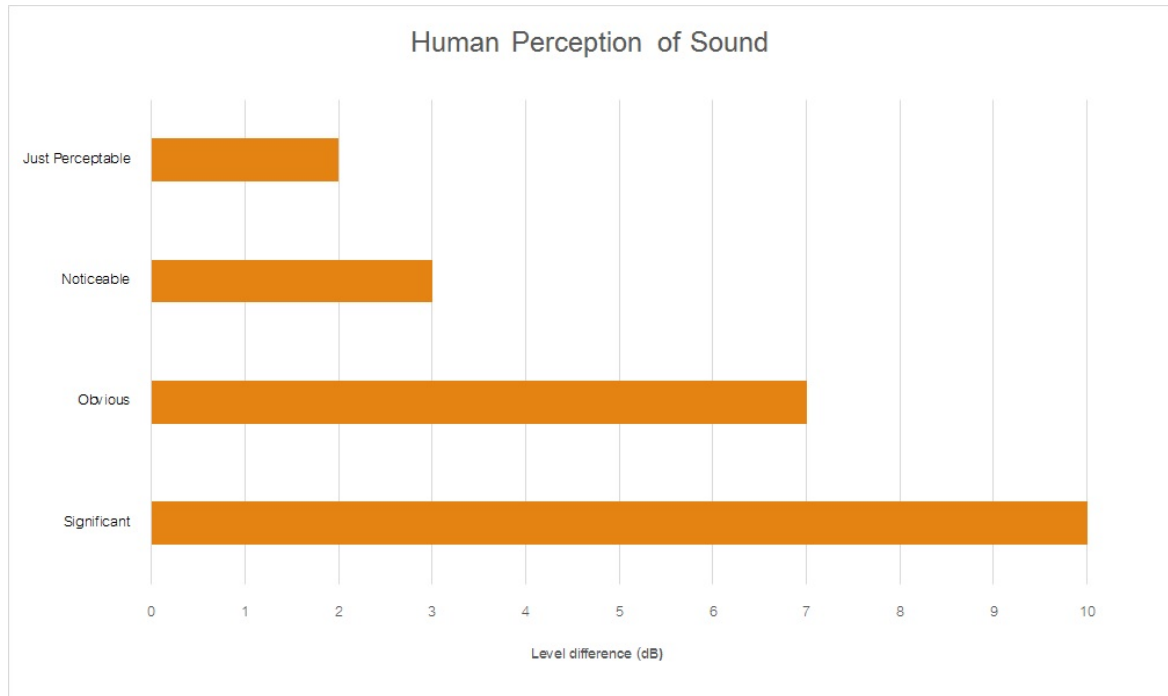
A number of technical terms have been used in this report and are explained in **Table A1**.

<b>Table A1 Glossary of Acoustical Terms</b>	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmx	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (Lw or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$ . Where W is the sound power in watts to the reference level of $10^{-12}$ watts.
Sound pressure level (Lp or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from Lw in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound

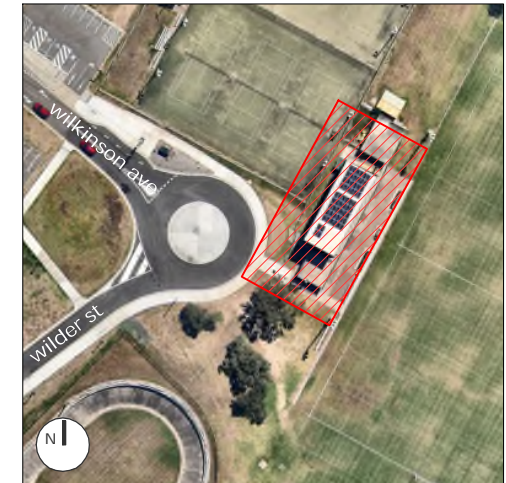


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# Appendix B – Site Plans



#### LOCALITY PLAN.



3 wilkinson avenue, muswellbrook

lot 7010, dp93327



#### DRAWING SCHEDULE.

REV	DESCRIPTION	DATE
00	COVER SHEET	28.05.2025
01	OVERALL SITE PLAN	28.03.2025
02	EXISTING PART SITE PLAN	28.05.2025
03	PART SITE PLAN	28.05.2025
04	EXISTING & DEMOLITION PLAN	28.05.2025
05	GROUND FLOOR - OVERALL	28.05.2025
06	FIRST FLOOR - OVERALL	28.05.2025
07	SECOND FLOOR - GENERAL ARRANGEMENT PLAN	28.05.2025
08	ROOF PLAN	28.05.2025
09	BUILDING ELEVATIONS 1	28.05.2025
10	BUILDING ELEVATIONS 2	28.05.2025
11	BUILDING ELEVATIONS 3	28.05.2025

#### PROJECT DESCRIPTION.

For the purpose of the Building Code of Australia, Vol. 1, 2022, the development may be described as follows:

**classification - NCC 'part A6'**  
The building has been classified as a 'Class 9b' building - grandstand & clubhouse

**rise in stories - NCC 'part C2D3'**  
The building has a rise in stories of three.

**effective height - NCC 'schedule 1 definitions'**  
The building has an effective height of zero, ie less than 25.0m.

**type of construction required - NCC 'part A6, part C2D2 - table C2D2'**  
Class 9b building - 'Type C' construction. The building has been deemed 'conditioned' excluding the toilets & airlocks.

**climate zone - NCC 'schedule 1 definitions'**  
The building is located within climate zone 6.

#### GENERAL NOTES.

In addition to the National Construction Code series, Building Code of Australia Vol. 1, 2022, the Plumbing Code of Australia, 2022 & the building regulations applicable to the state of New South Wales, the following applicable Australian Standards & codes of practice are to be adhered to through the documentation & construction works:

- AS1668 - Mechanical ventilation & air conditioning in Buildings
- AS3000 - Electrical installations; buildings, structures & premises (known as the saa wiring rules)
- AS1428.1 - General requirements for access - buildings
- AS2890.6 - Off-street parking; mandatory requirements
- AS1880.0 - Interior lighting - safe movement

These drawings shall be read in conjunction with all architectural & other consultants drawings & specifications & with such other written instructions as may be issued during the course of the contract. All discrepancies shall be referred to 'Barnson Pty Ltd' for a decision before proceeding with the work.

All dimensions are in millimetres unless stated otherwise & levels are expressed in metres. Figured dimensions are to be taken in preference to scaled dimensions unless otherwise stated. All dimensions are nominal, and those relevant to setting out & off-site work shall be verified by the contractor before construction & fabrication.

# OLYMPIC PARK GRANDSTAND REDEVELOPMENT

3 WILKINSON AVENUE,

MUSWELLBROOK NSW 2333

**barnson.**  
DESIGN . PLAN . MANAGE

Project:  
**OLYMPIC PARK GRANDSTAND REDEVELOPMENT**  
Site Address:  
3 WILKINSON AVENUE,  
MUSWELLBROOK NSW 2333  
Client:  
MUSWELLBROOK SHIRE COUNCIL

Drawing Title:  
**COVER SHEET**

Scale: As indicated @A1  
Sheet: 01 of 65  
Project No: 44840

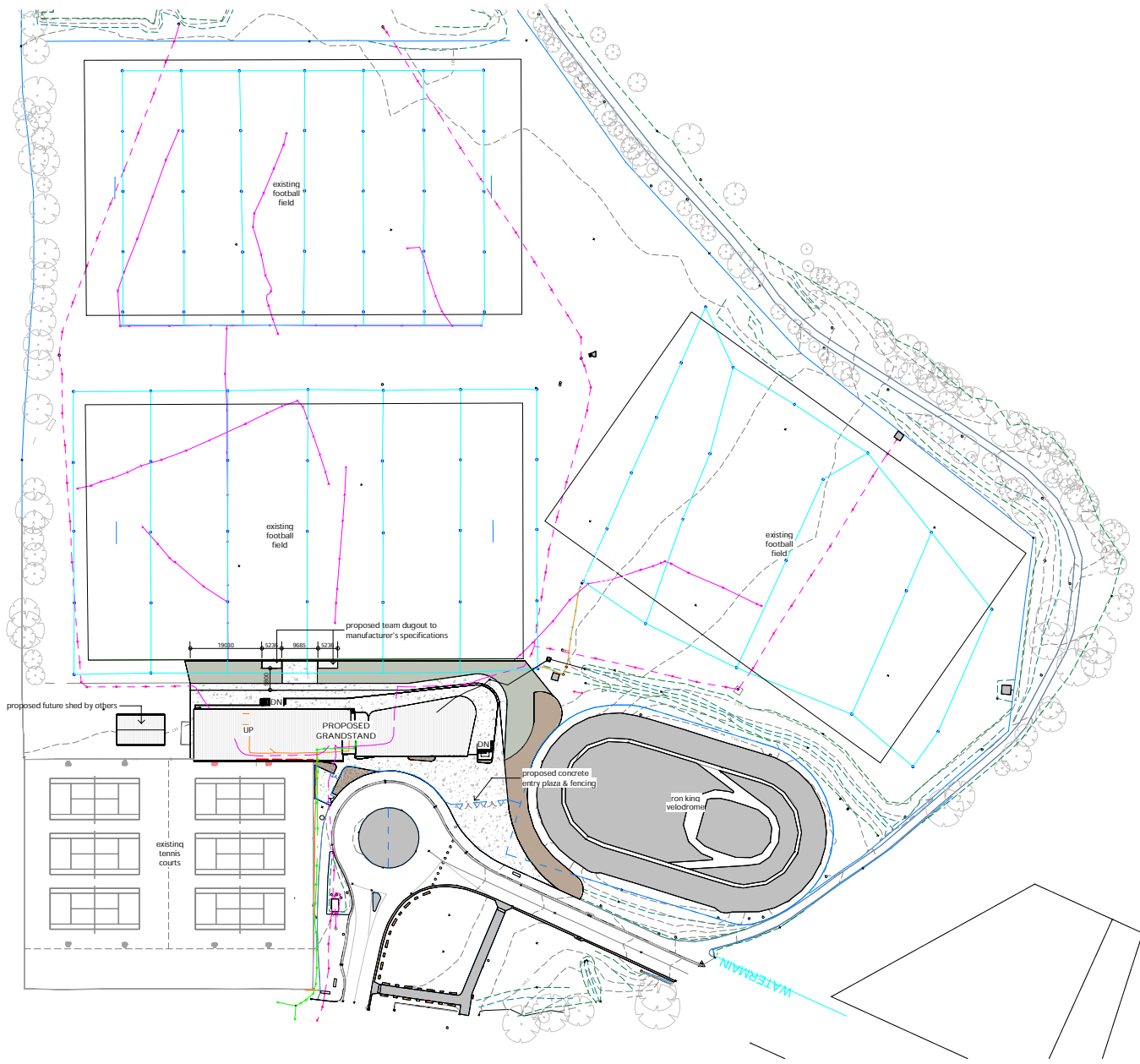
Drawing No.

Drawn: TP  
Checked: KG  
Revision: B

44840-  
**A00**



**01 OVERALL SITE PLAN**  
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 0 6000 12000 24000 60000



**ISSUED FOR MODIFIED DA**



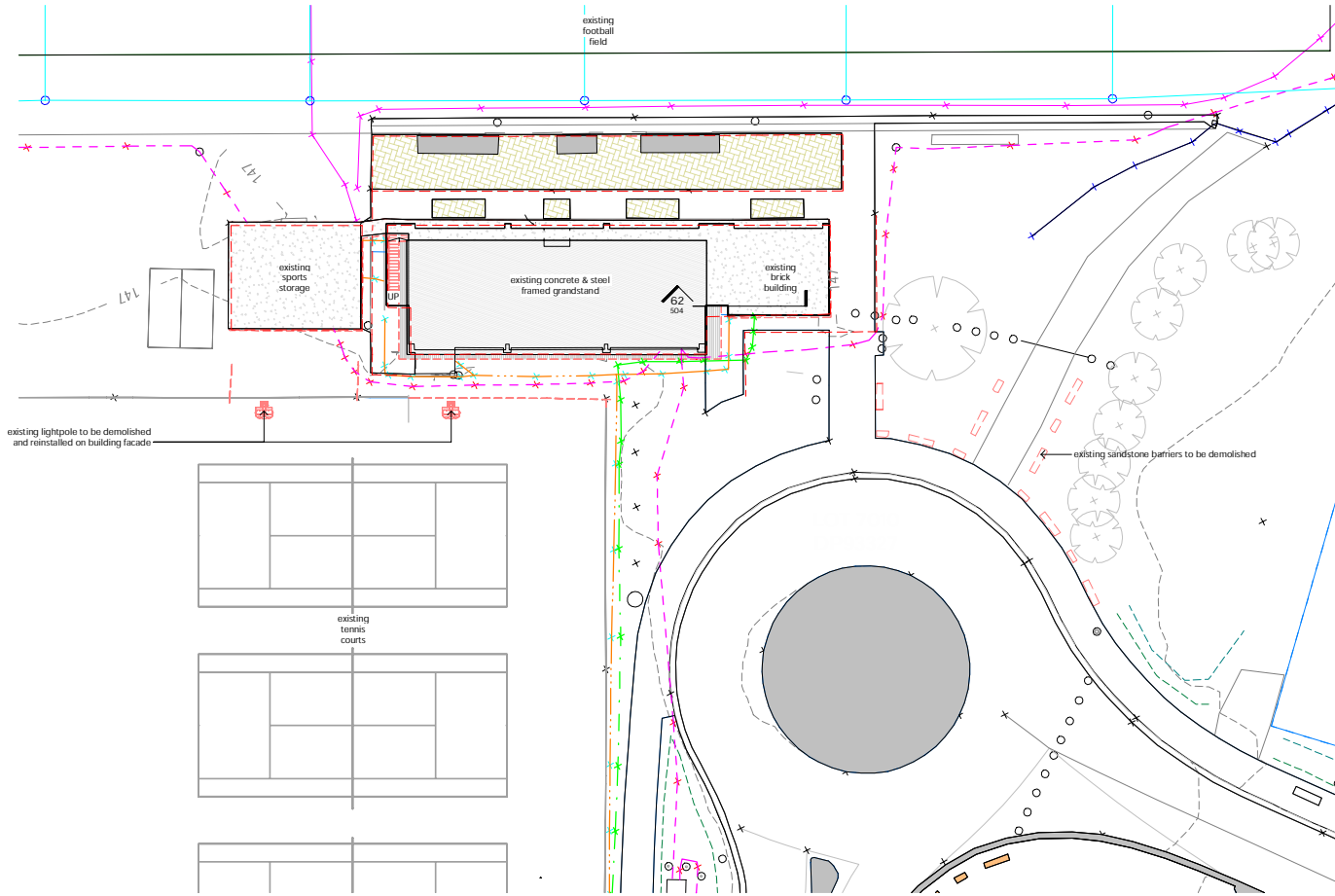
**03** EXISTING & DEMO PART SITE PLAN

Scale: 1:200 @ A1

0 2000 4000 8000 20000

**EXISTING SITE LEGEND.**

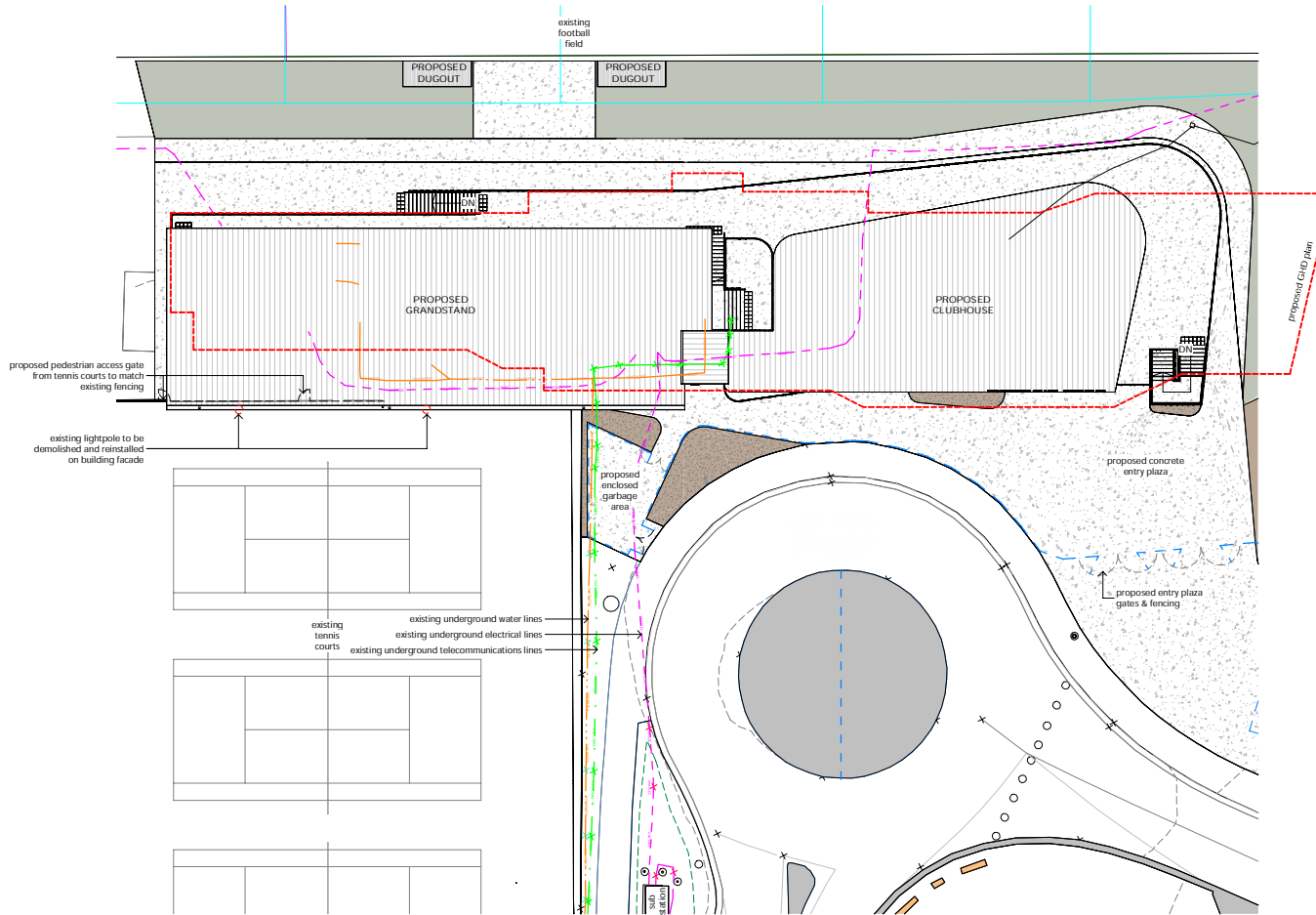
- |  |                                 |  |                                     |
|--|---------------------------------|--|-------------------------------------|
|  | proposed boundary               |  | existing vegetations                |
|  | existing boundary               |  | existing fence line                 |
|  | existing easement               |  | underground stormwater              |
|  | existing major contours         |  | underground sewer                   |
|  | existing minor contours         |  | underground telecommunications line |
|  | existing buildings & structures |  | overhead electrical lines           |
|  | existing concrete paths         |  | underground electrical lines        |
|  | existing driveways              |  | underground irrigation lines        |
|  |                                 |  | underground water lines             |



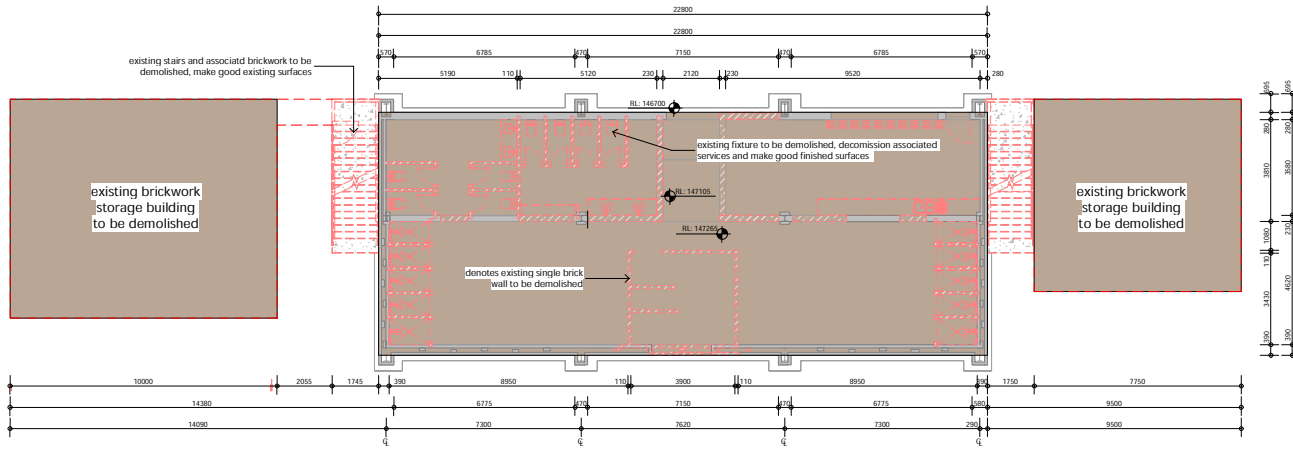
ISSUED FOR MODIFIED DA



**04 PART SITE PLAN**  
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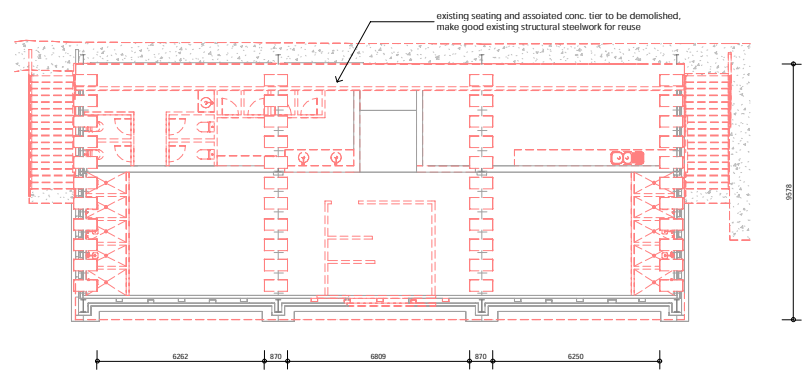
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**DEMOLITION LEGEND.**

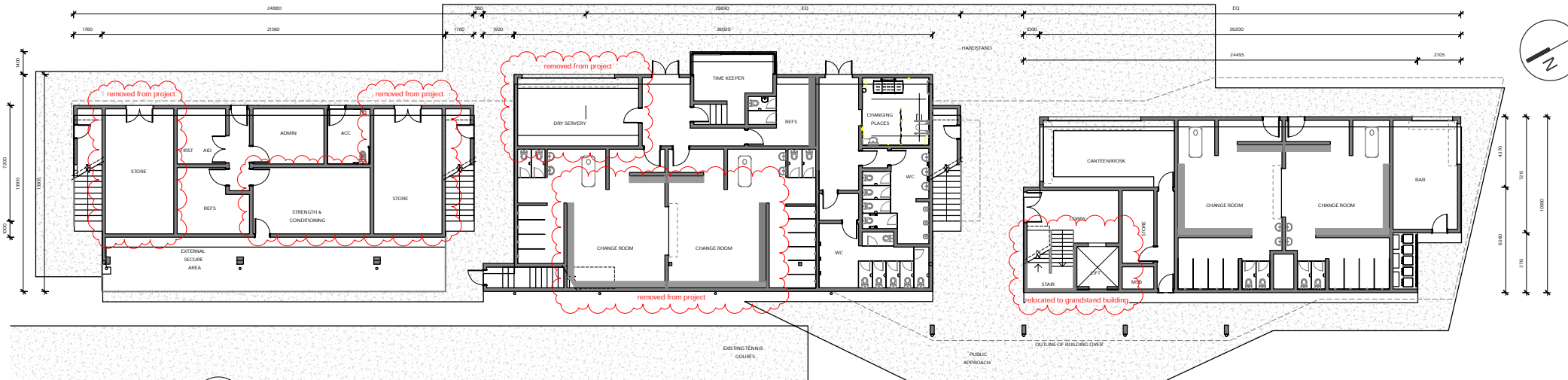
- denotes existing elements to be demolished, make good to existing surfaces
- denotes existing walls to be demolished, make good to existing surfaces
- denotes existing doors to be demolished, make good to existing surfaces
- denotes existing windows to be demolished, make good to existing surfaces

**05 GROUND FLOOR DEMOLITION**  
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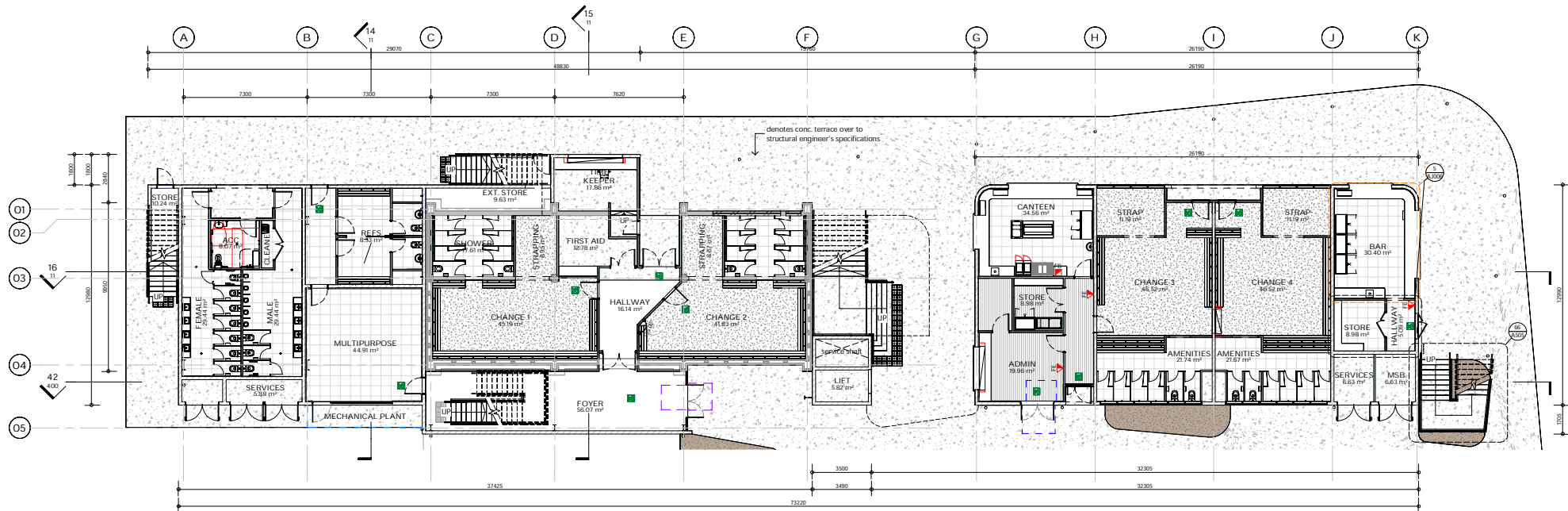


**06 SEATING DEMOLITION**  
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ISSUED FOR MODIFIED DA

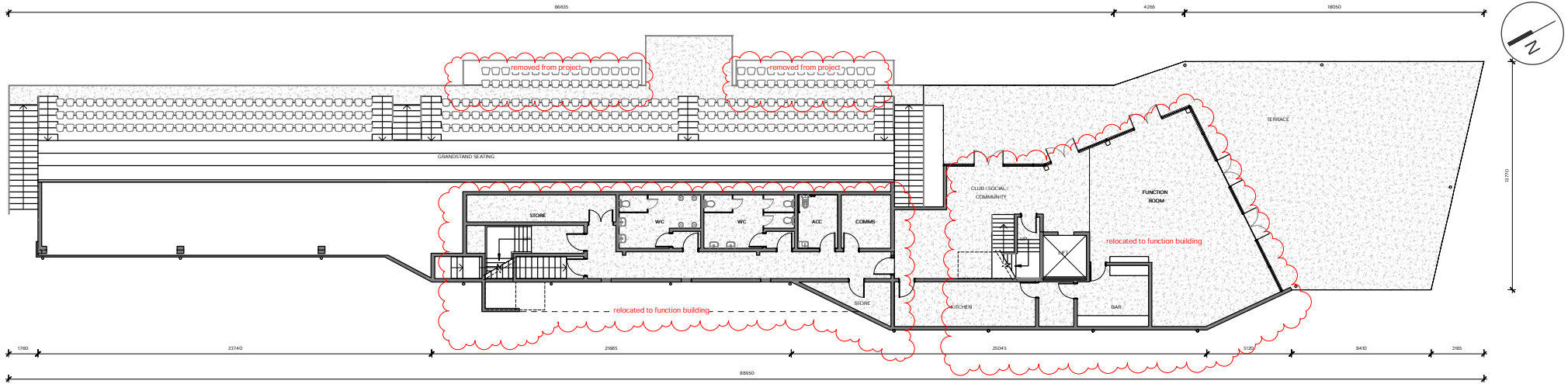


**07** GHD - GROUND FLOOR OVERALL  
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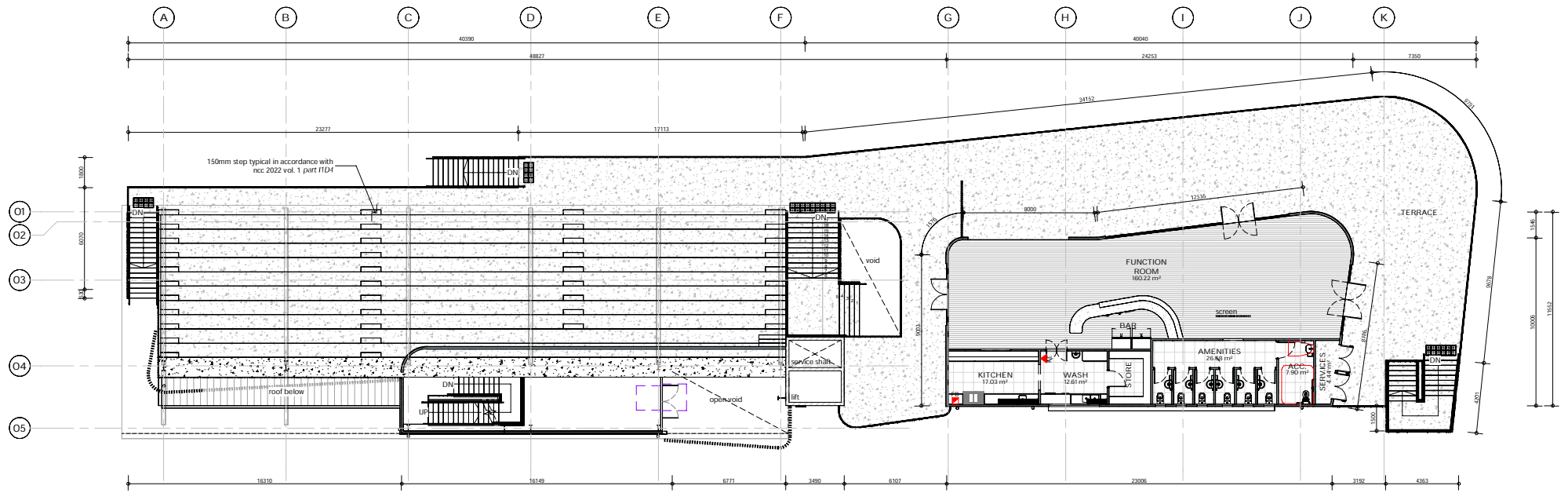


**08** PROPOSED GROUND FLOOR OVERALL  
 Scale 1 : 125 @ A1

ISSUED FOR MODIFIED DA

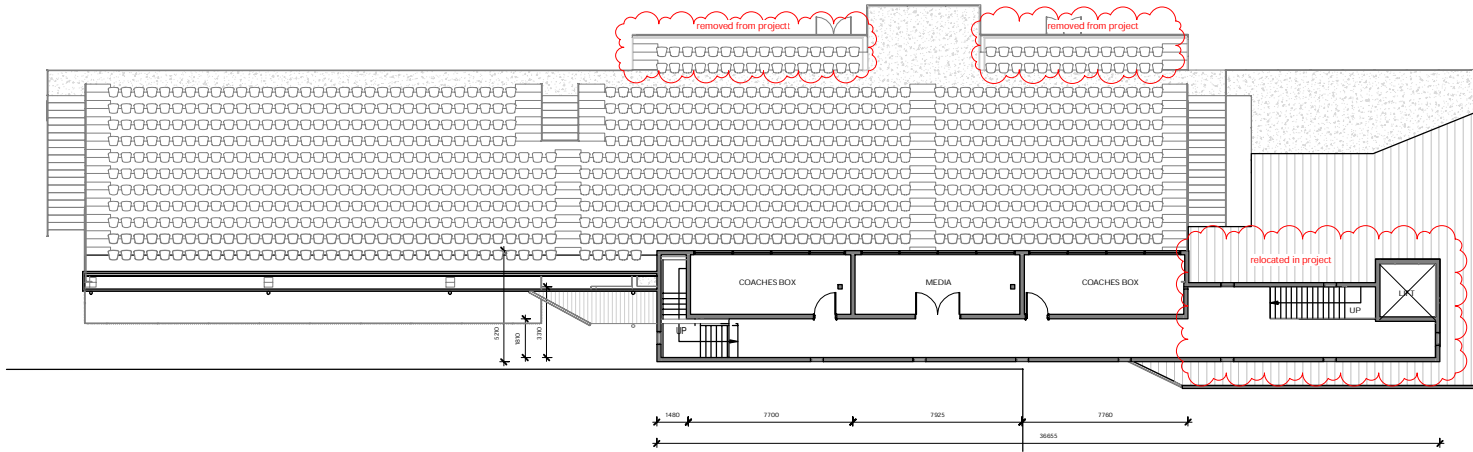


**09** GHD - FIRST FLOOR OVERALL  
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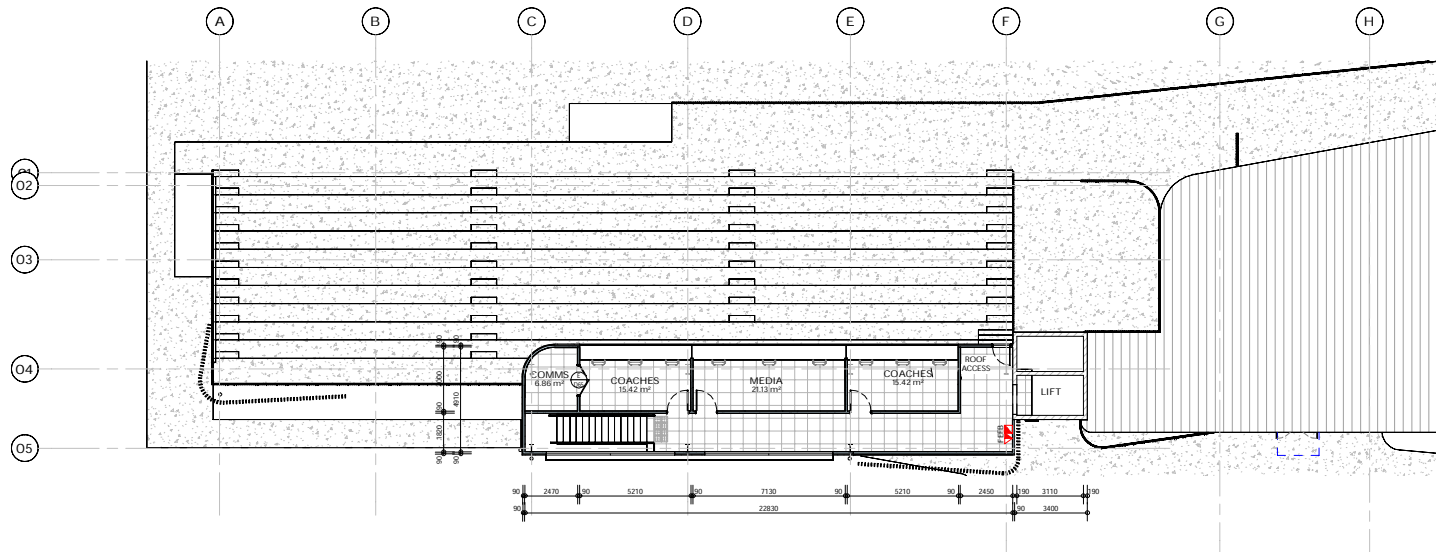


**10** PROPOSED FIRST FLOOR - OVERALL  
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ISSUED FOR MODIFIED DA

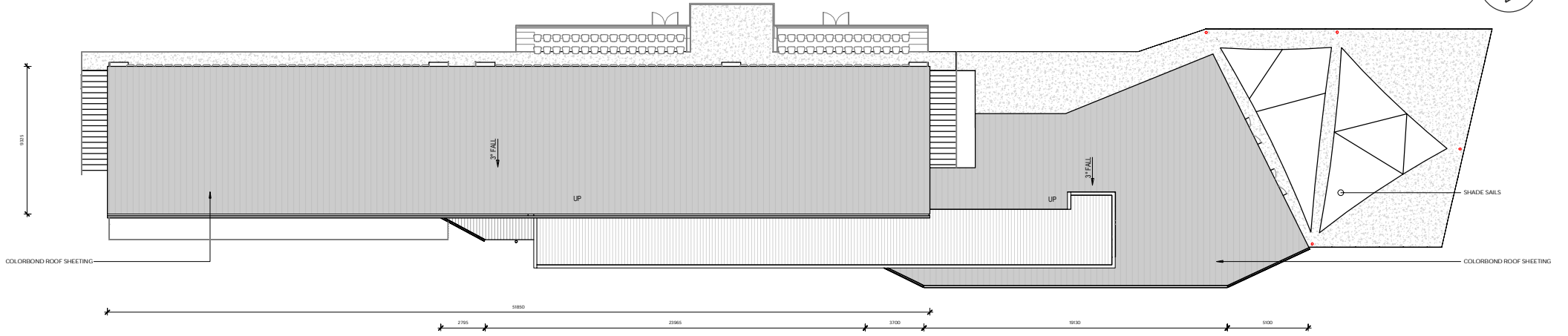


**11** GHD - SECOND FLOOR  
Scale 1: 125 @ A1

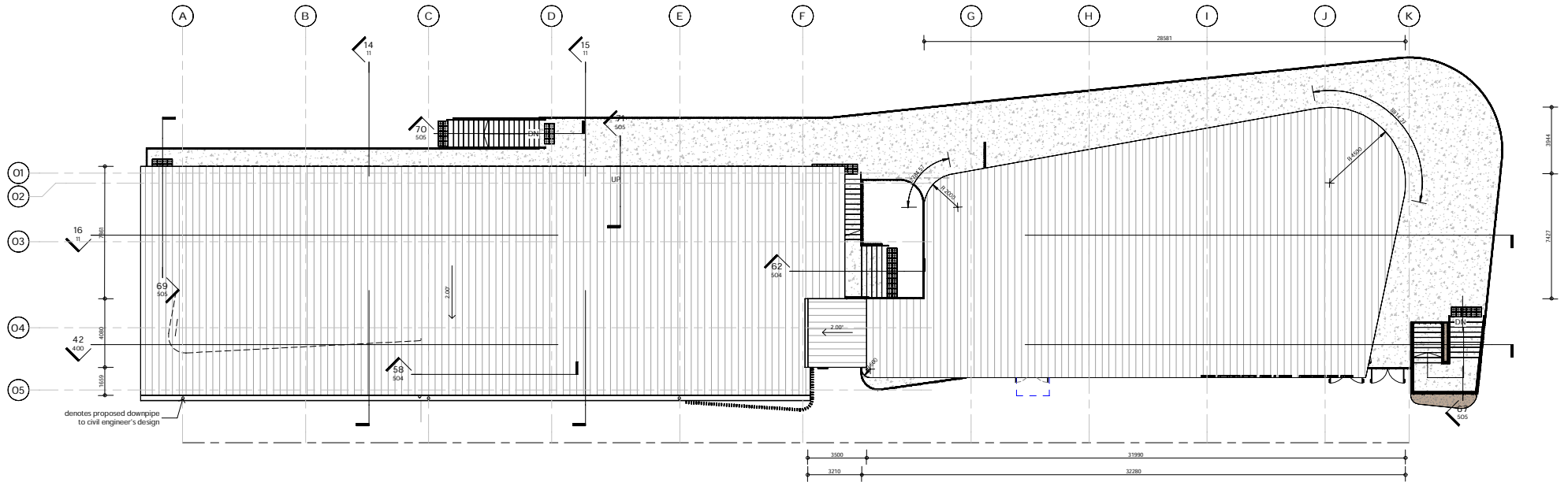


**12** PROPOSED SECOND FLOOR  
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ISSUED FOR MODIFIED DA

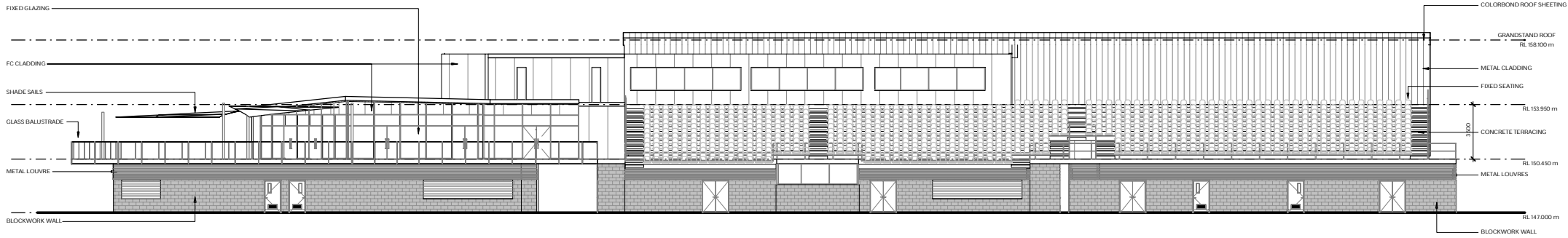


13 GHD - ROOF PLAN  
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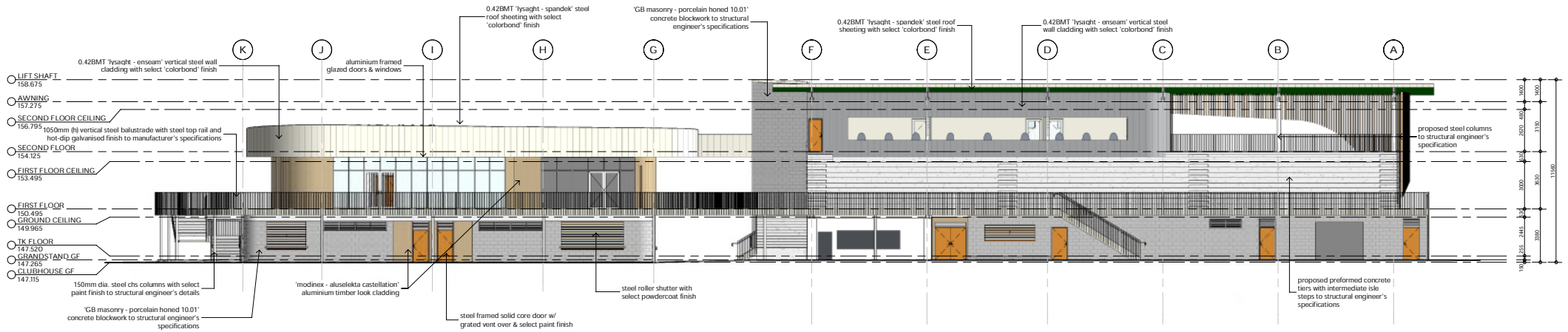


14 ROOF PLAN  
Scale 1: 125 @ A1

ISSUED FOR MODIFIED DA

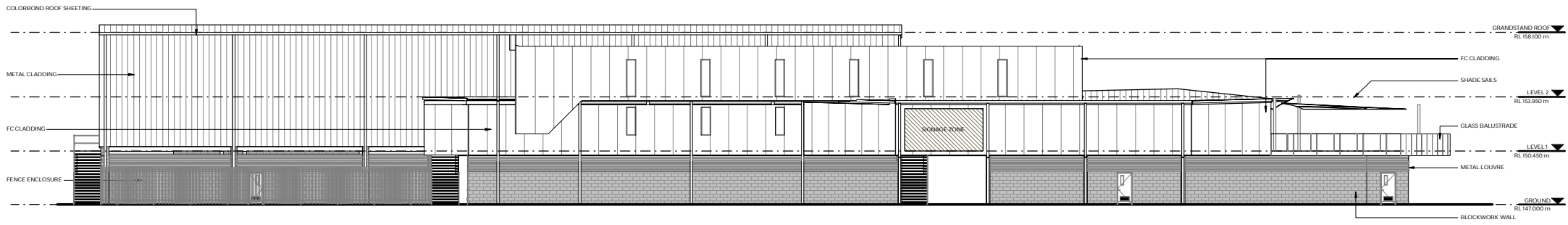


**15** ELEVATION. GHD PLAN - ELEVATION 01  
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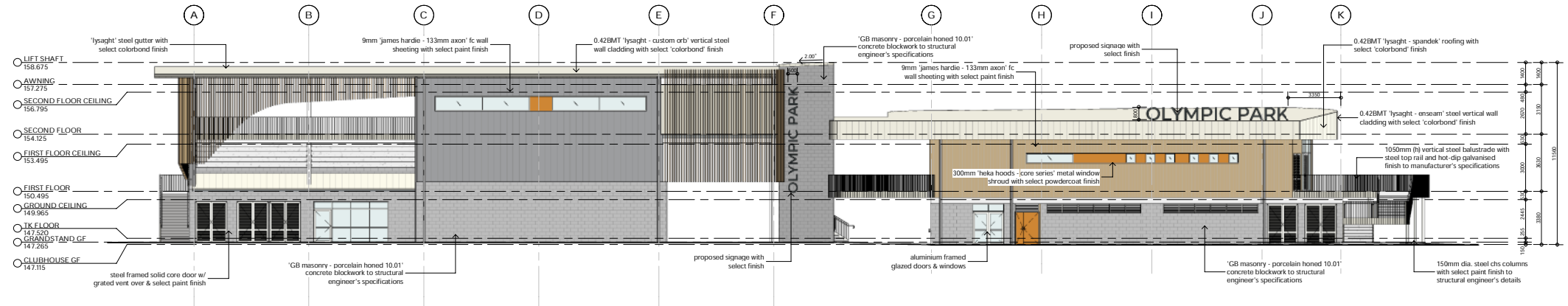


**16** ELEVATION. NORTH ELEVATION  
 Scale 1 : 125 @ A1

ISSUED FOR MODIFIED DA

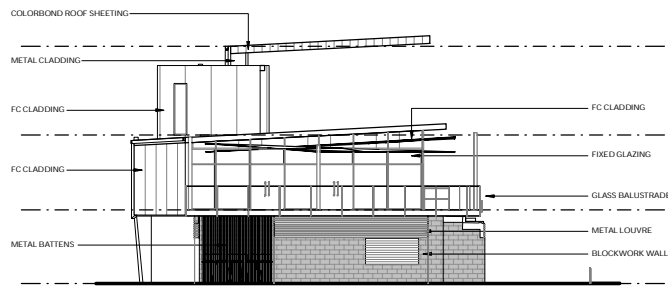


**17** ELEVATION. GHD PLAN - ELEVATION 03  
 Scale 1 : 125 @ A1

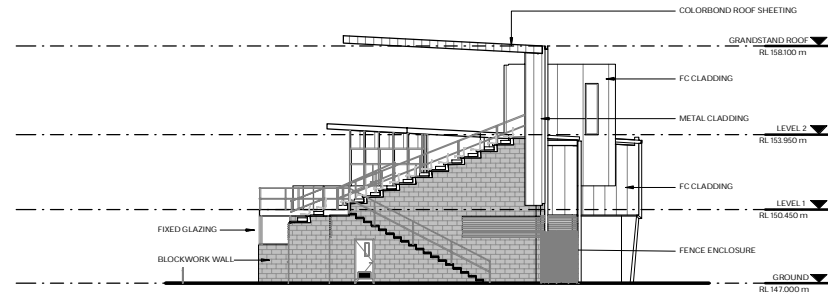


**18** ELEVATION. SOUTH ELEVATION  
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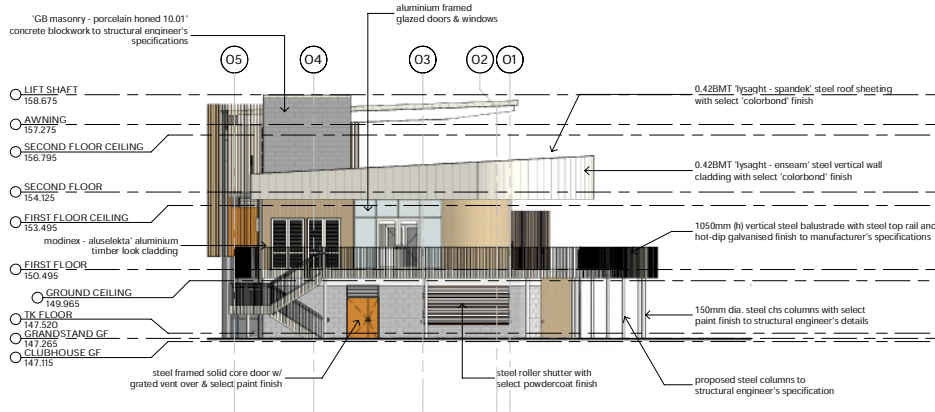
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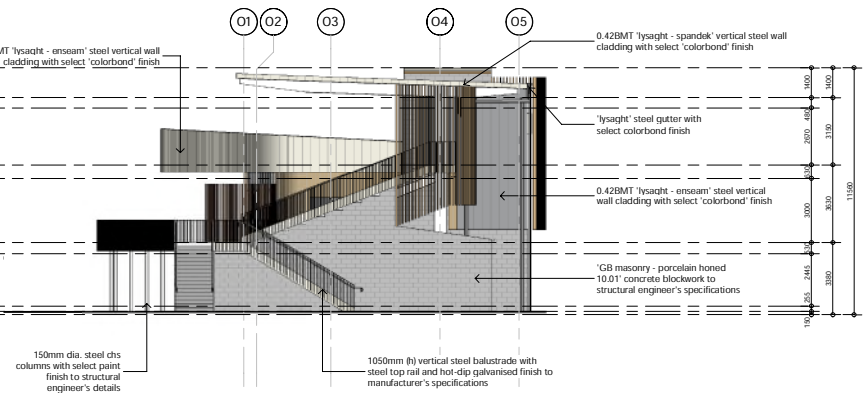
**19 ELEVATION. GHD PLAN - EAST ELEVATION**  
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**20 ELEVATION. GHD PLAN - WEST ELEVATION**  
 Scale 1 : 125 @ A1



**21 ELEVATION. EAST ELEVATION**  
 Scale 1 : 125 @ A1



**22 ELEVATION. WEST ELEVATION**  
 Scale 1 : 125 @ A1

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# Appendix C – Noise Monitoring Charts

**Table C1 Background Noise Monitoring Summary – Location L1**

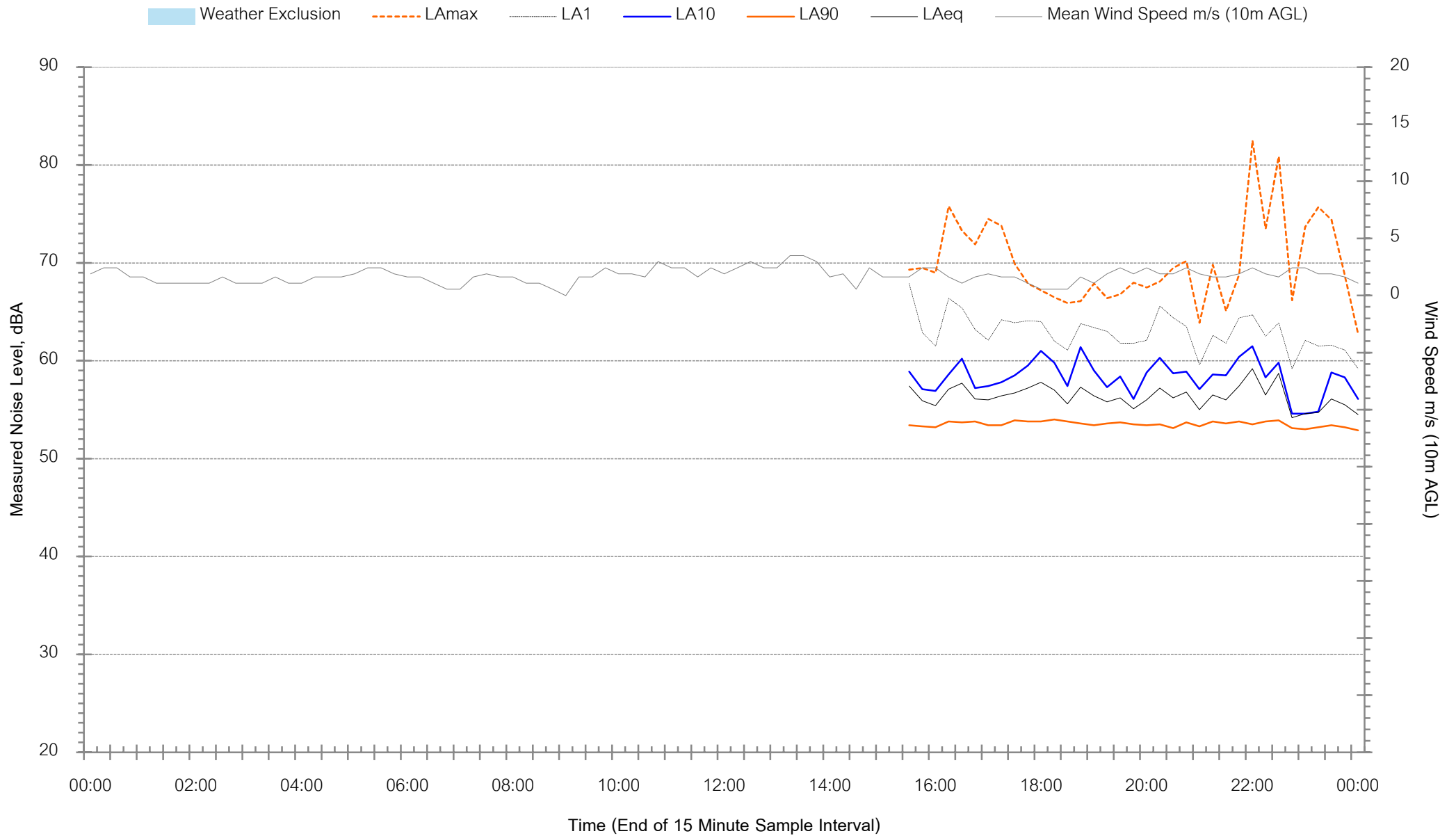
Date	Measured Background Noise Level (LA90) dB ABL <sup>1</sup>			Measured dB LAeq(period)		
	Day	Evening	Night	Day	Evening	Night
Tuesday 12 August 2025	--	53	53	--	57	55
Wednesday 13 August 2025	52	52	52	55	55	55
Thursday 14 August 2025	52	52	51	58	54	54
Friday 15 August 2025	50	51	51	58	55	54
Saturday 16 August 2025	51	50	50	56	53	54
Sunday 17 August 2025	49	50	49	53	54	54
Monday 18 August 2025	49	49	49	55	53	54
Tuesday 19 August 2025	49	49	49	54	54	53
Wednesday 20 August 2025	50	54	52	56	58	55
Thursday 21 August 2025	--	--	--	--	--	--
.Location1 – RBL / Leq Overall	50	51	51	56	55	54

Note 1: Assessment Background Level (ABL) – the single-figure background level representing each assessment period day, evening, and night as per NPI Fact Sheet A.

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

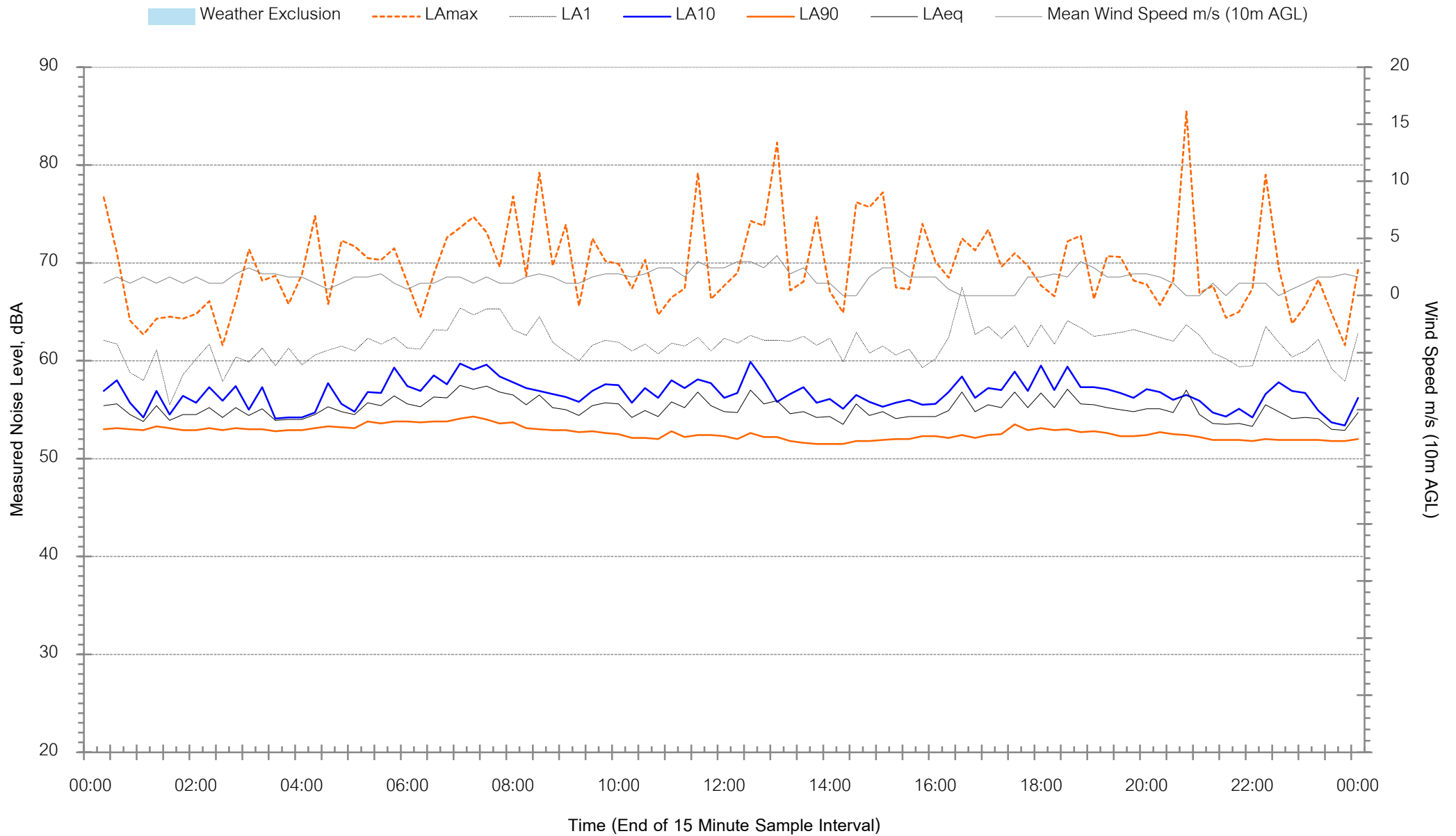
# Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Tuesday 12 August 2025



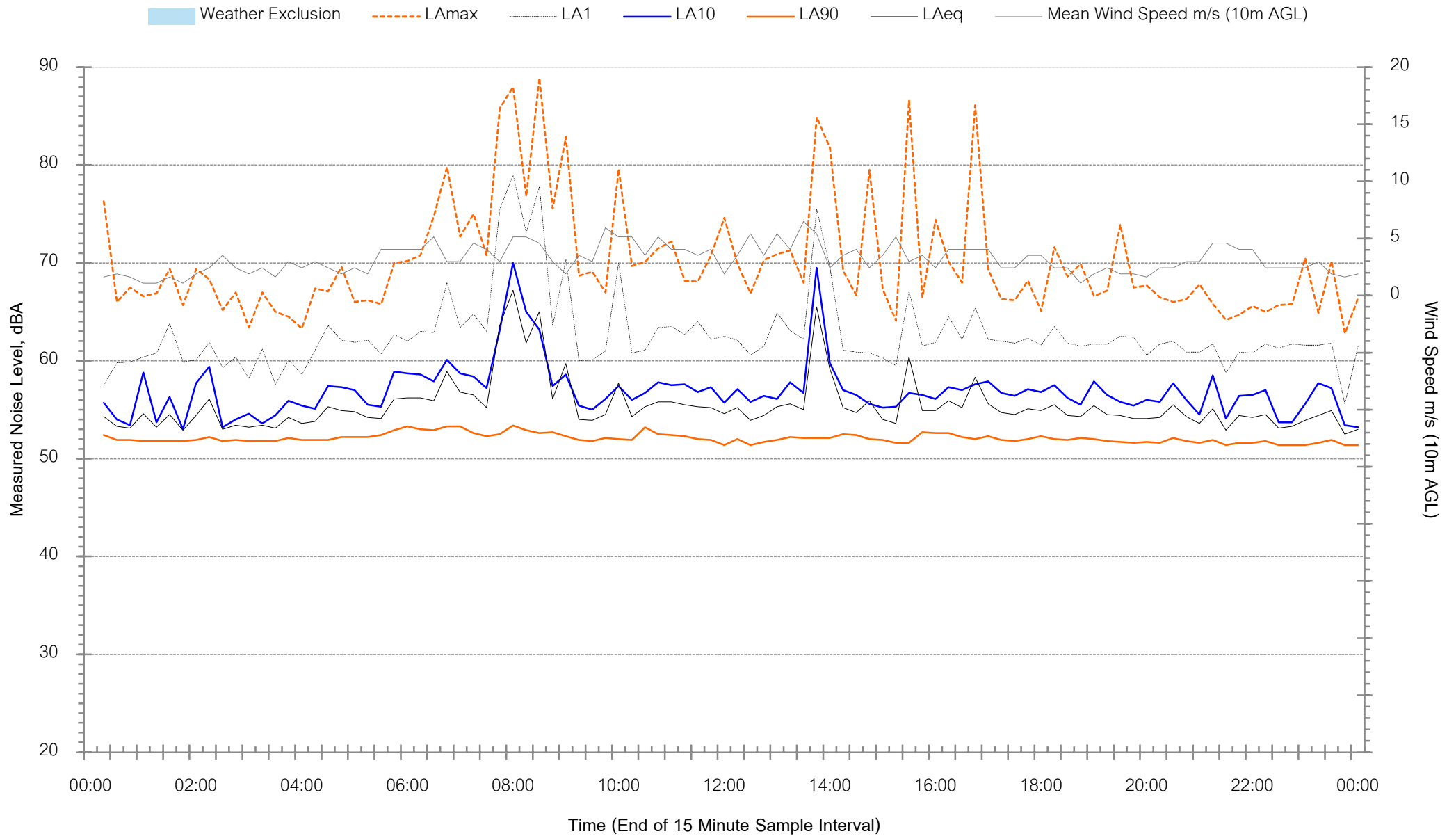
# Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Wednesday 13 August 2025



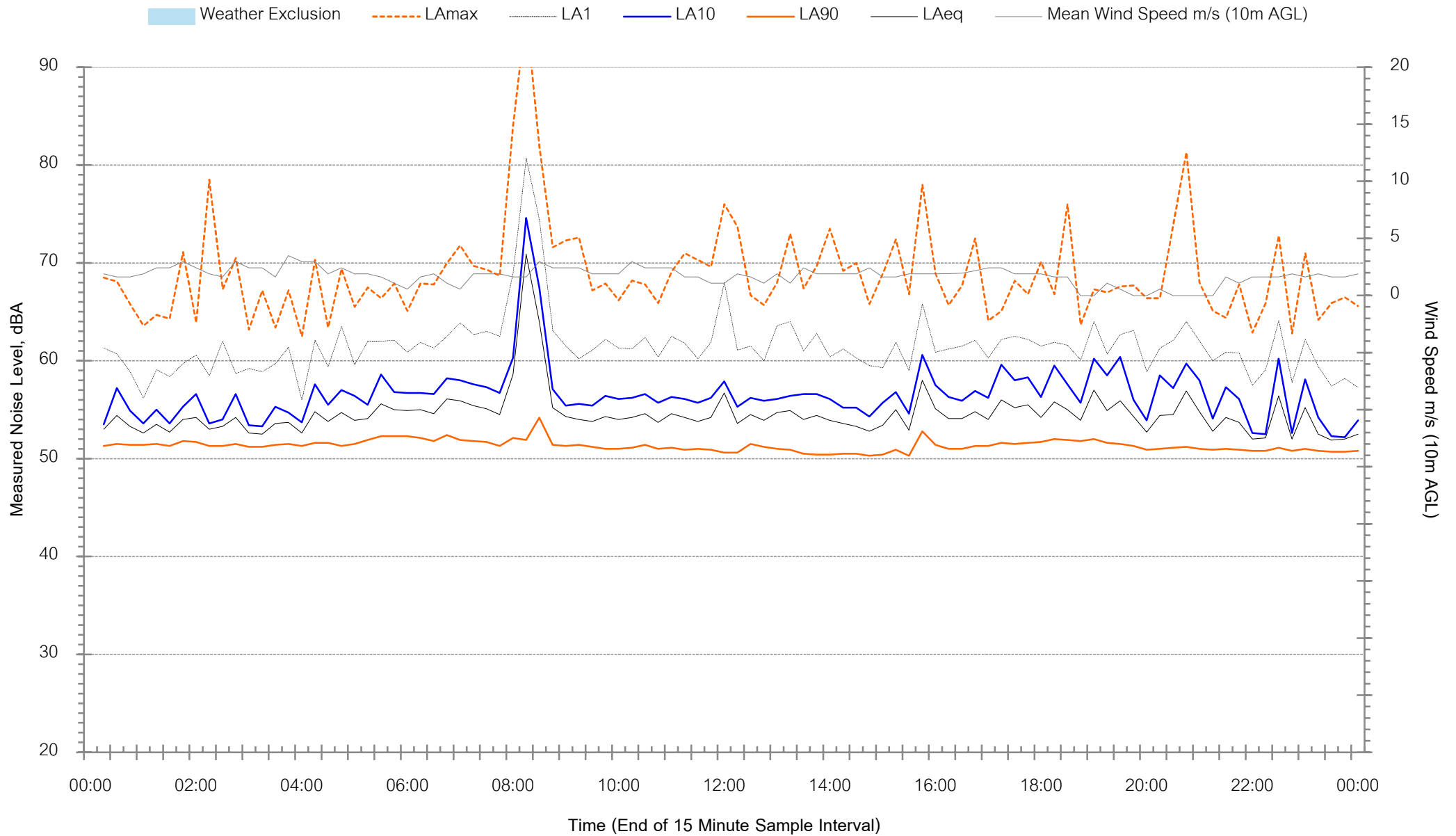
### Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Thursday 14 August 2025



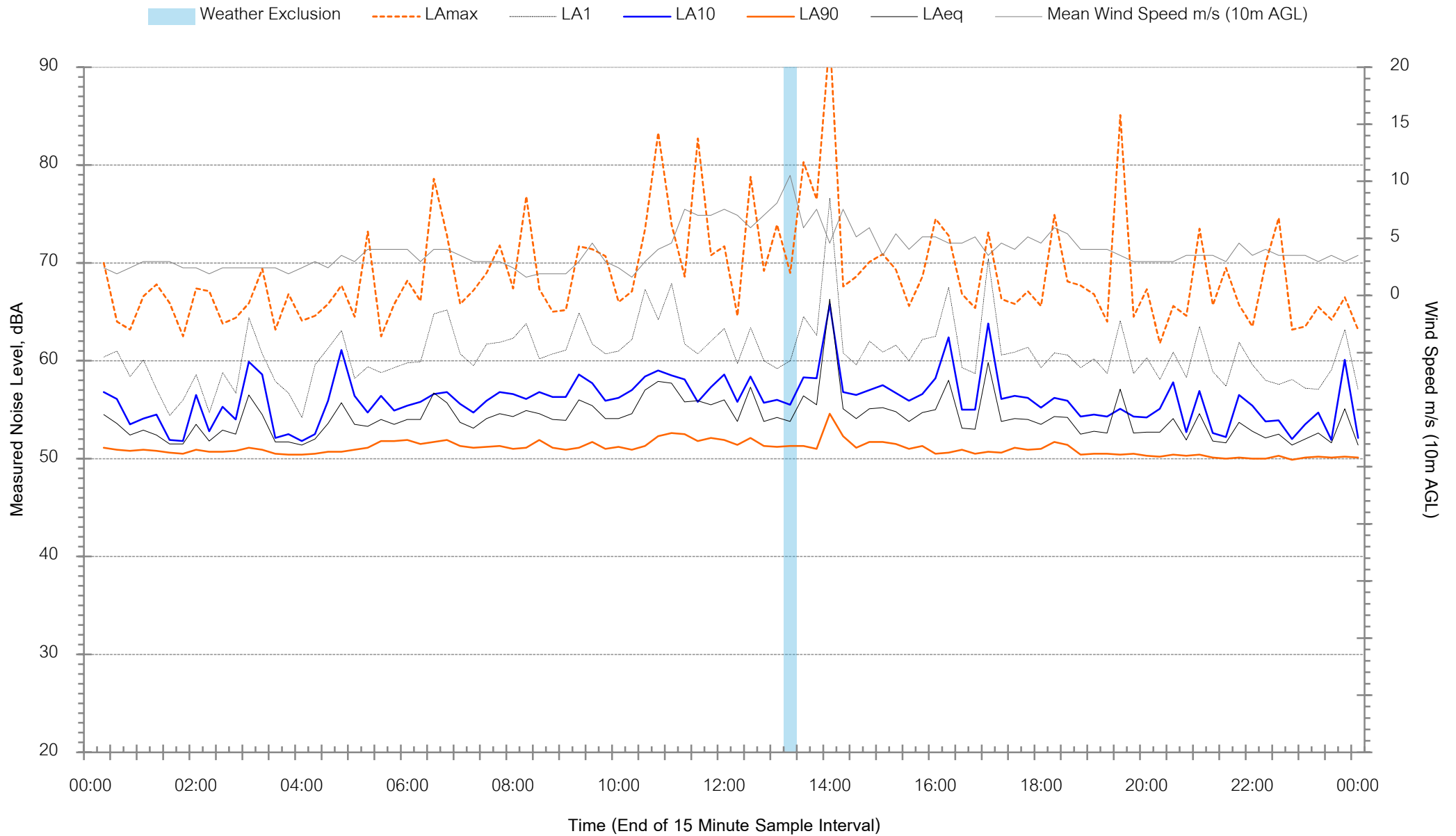
### Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Friday 15 August 2025



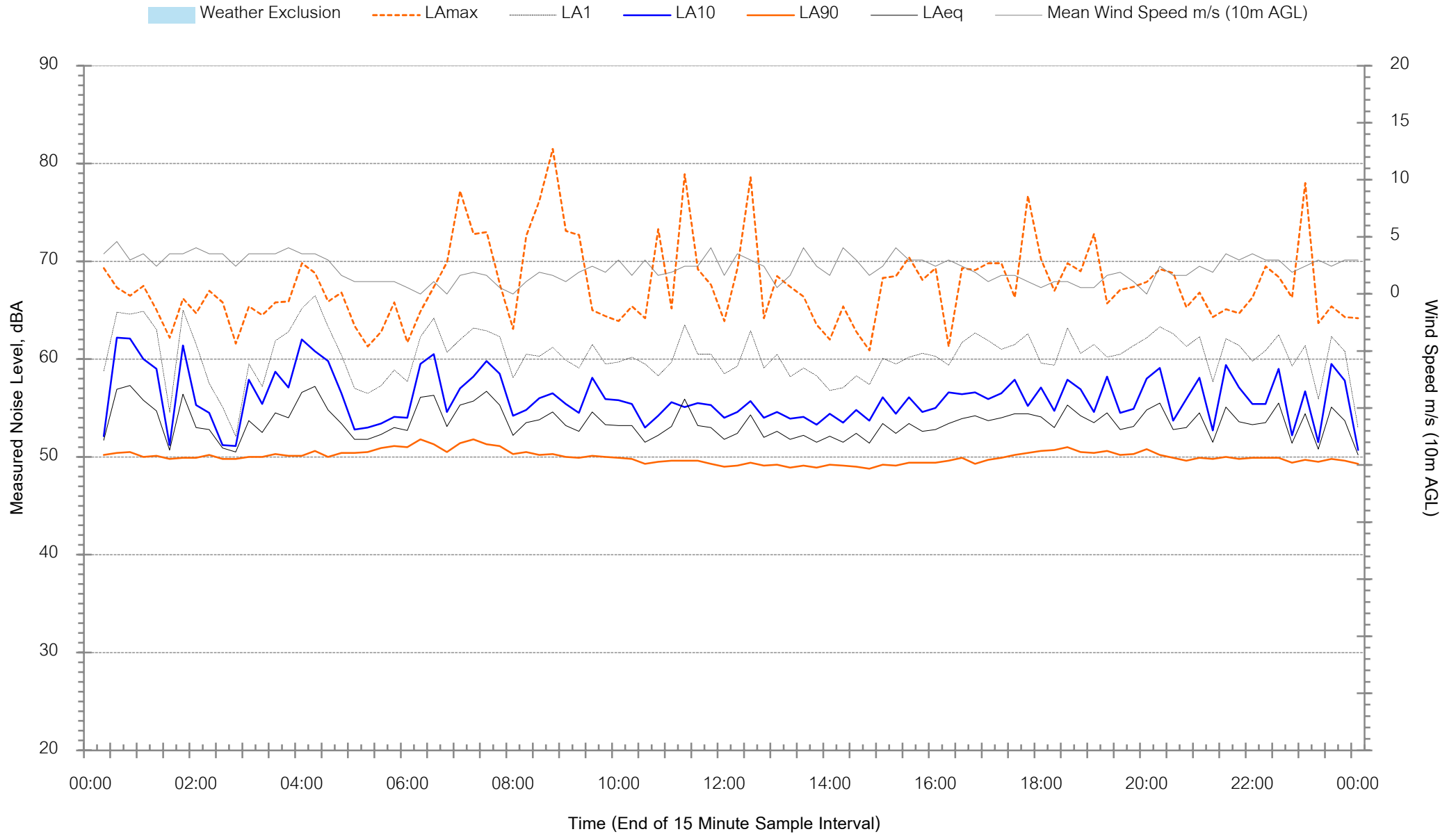
### Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Saturday 16 August 2025



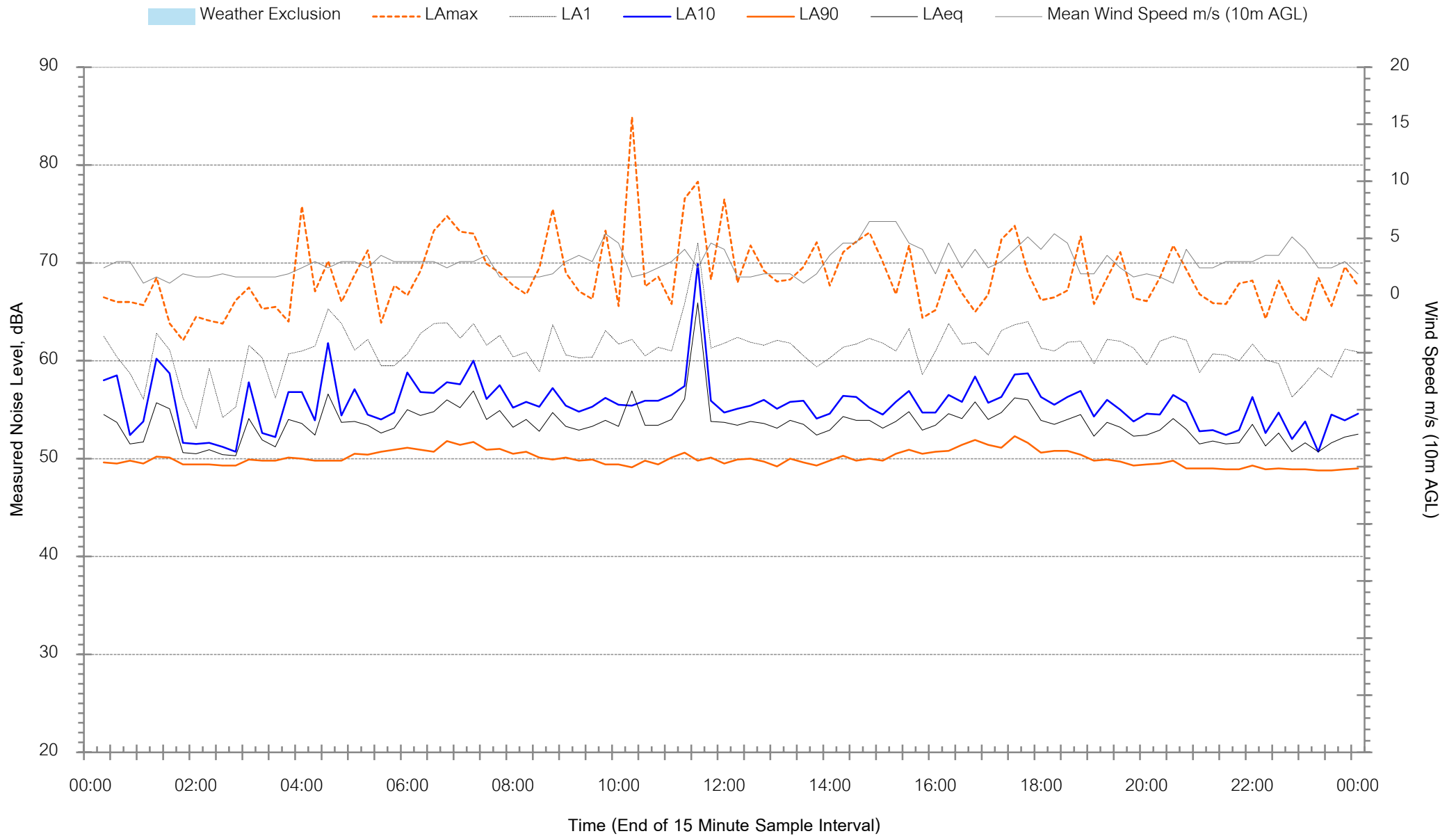
### Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Sunday 17 August 2025



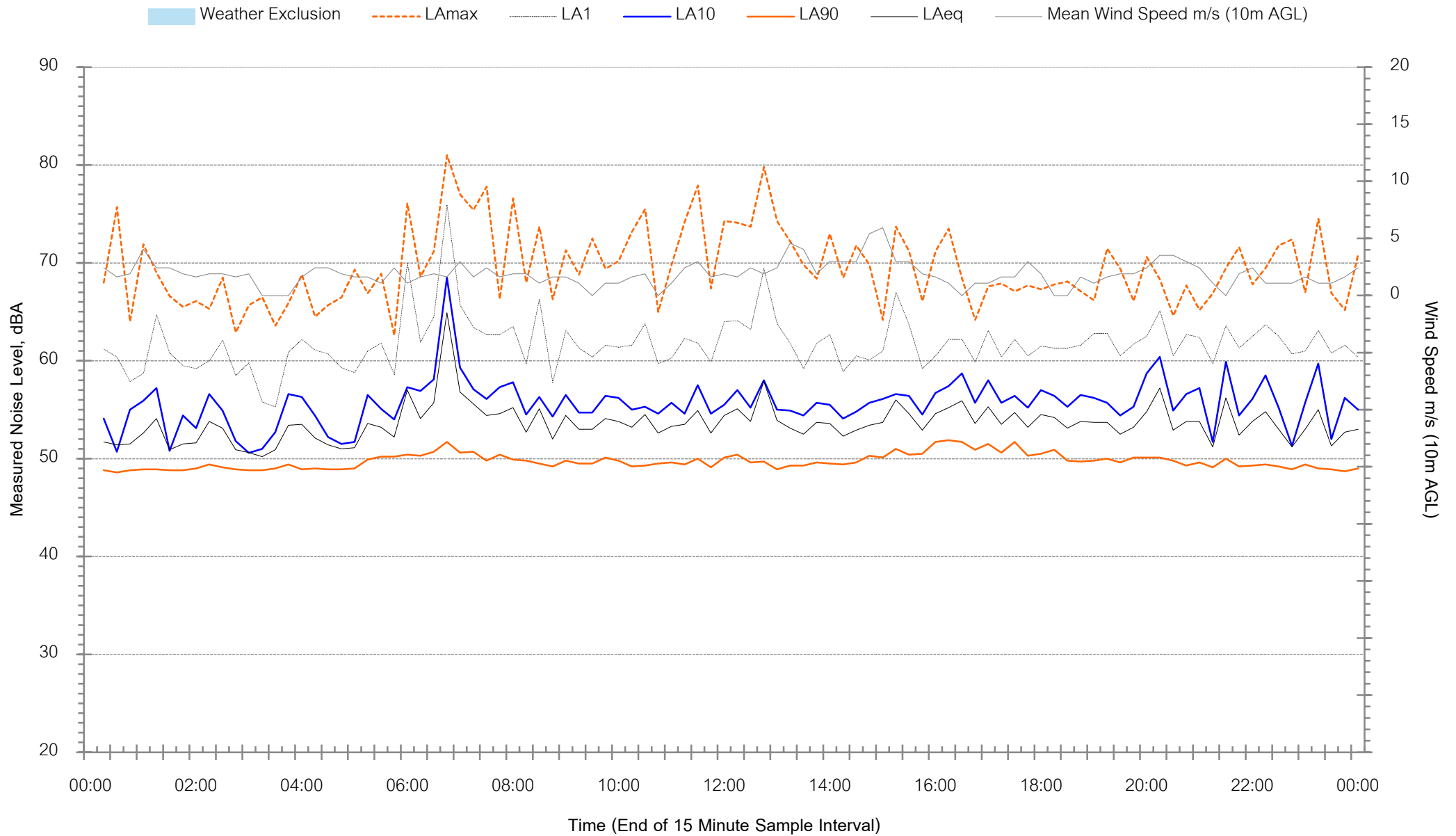
### Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Monday 18 August 2025



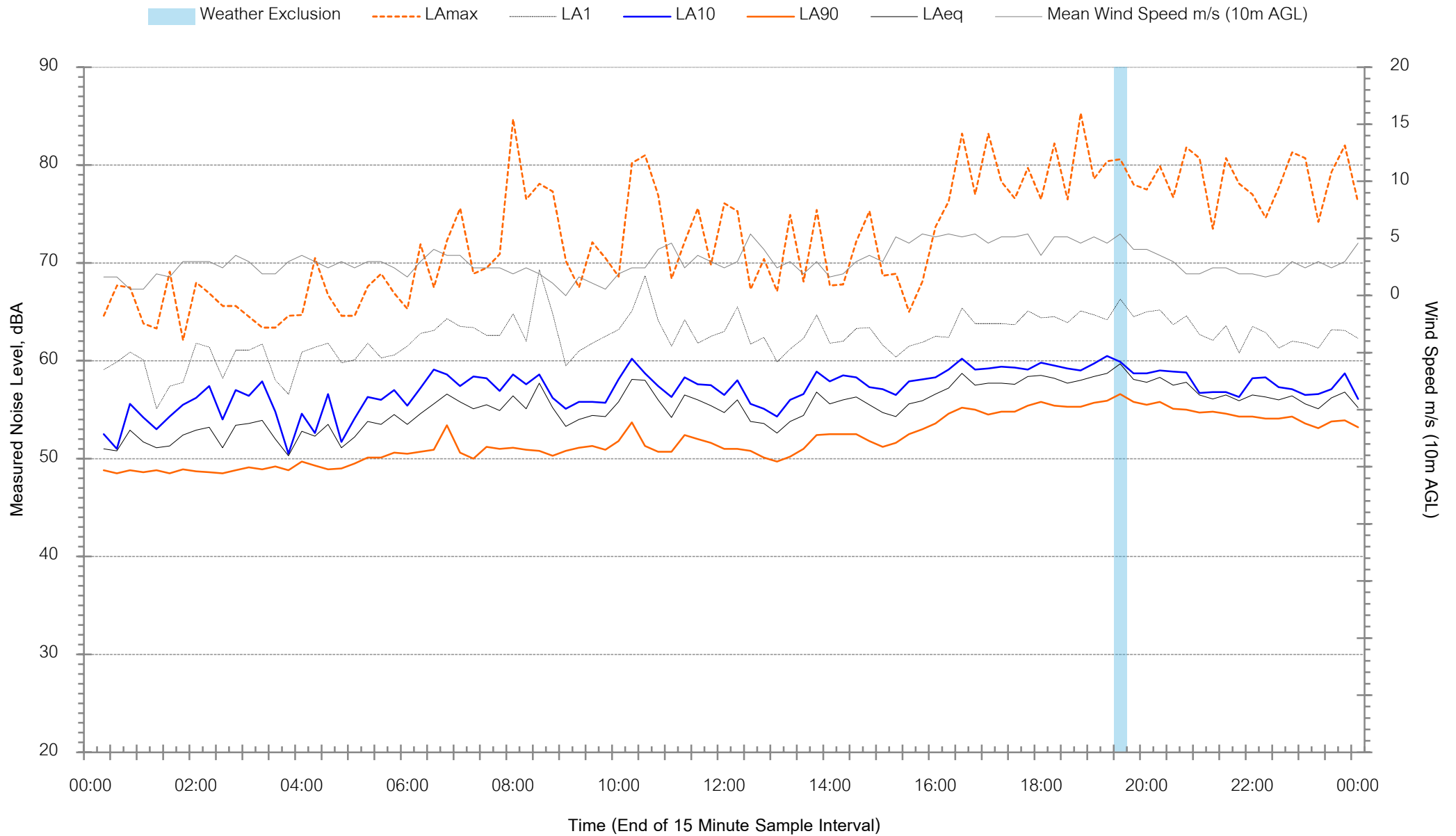
### Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Tuesday 19 August 2025



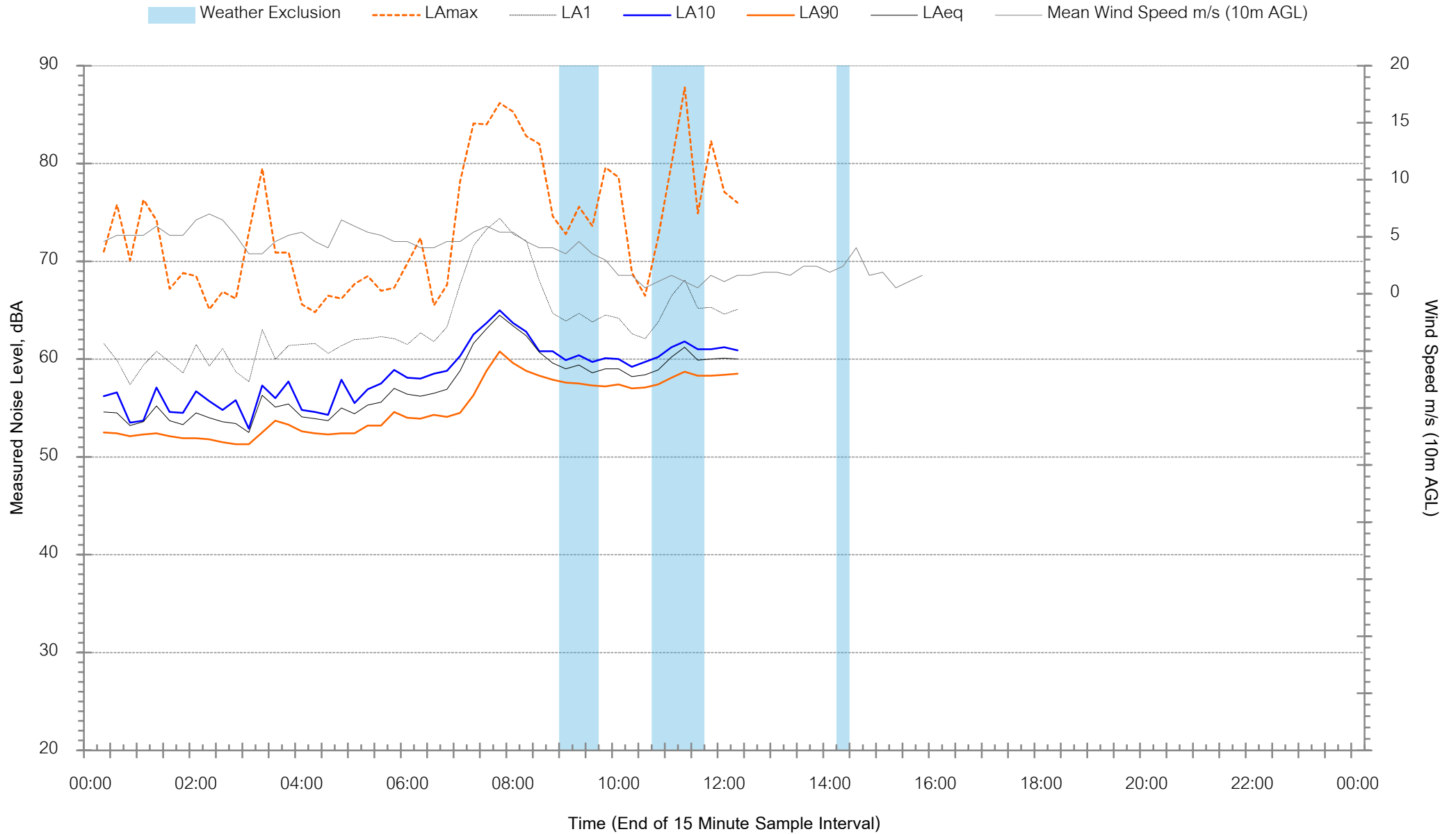
# Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Wednesday 20 August 2025



### Background Noise Levels

Gyarran Street, Muswellbrook, New South Wales - Thursday 21 August 2025



# Appendix D – Determination of NPI Receiver Category

Table D1 - Determination of NPI Residential Receiver Category

Location/ Catchment		Period	Measured RBL dB LA90(period)	Land Use Zone				Typical Existing Background Noise Levels Table 2.3 NPI			Rural Residential - an area with an acoustical environment that:		Suburban Residential - an area that has:		Urban Residential- an area with an acoustical environment that:	
				Rural	Suburban	Urban	Commercial, Industrial	RURAL Daytime <40 Eve <35 Night <30	SUBURBAN Daytime <45 Eve <40 Night <35	URBAN Daytime >45 Eve >40 Night >35	is dominated by natural sounds. having little or no road traffic noise generally characterised by low background noise levels. Settlement patterns would be typically sparse	local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. evening ambient noise levels defined by the natural environment and human activity.	is dominated by 'urban hum' or industrial source noise has through-traffic with characteristically heavy and continuous traffic flows during peak is near commercial districts or industrial districts has any combination of the above			
Location 1	Day	50			✓			✓					✓			
	Evening	51			✓			✓					✓			
	Night	51			✓			✓					✓			

where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources

Assessment

Location	Rural	Suburban	Urban	Rural - RBL	Suburban - RBL	Urban - RBL	Rural - Description				Suburban - Description			Urban - Description					
Location 1	0	0	6	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3

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