

Noise Assessment

Proposed Medical Centre Development
Lot 2 DP1264030 Hillvue Road
South Tamworth, NSW

Prepared for: Tamworth Aboriginal Medical Service (TAMS)
C/- Barnson Pty Ltd
November 2024
MAC231898-01RP1



Document Information

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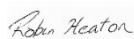
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DOCUMENT ID	DATE	PREPARED	SIGNED	REVIEWED	SIGNED
MAC231898-01RP1	1 November 2024	Robin Heaton		Oliver Muller	

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Barnson Pty Ltd (Barnson), on behalf of Tamworth Aboriginal Medical Service (TAMS) to prepare a Noise Assessment (NA) to quantify emissions from the proposed Medical Centre Development (the project) to be located at Lot 2 DP1264030, Hillvue Road, South Tamworth, NSW.

The NA has quantified potential operational noise emissions from the project 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 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; and
- International Organisation for Standardisation (ISO) 9613-2:1996 (ISO9613:2) - Acoustics - Attenuation of Sound during Propagation Outdoors - Part 2: General Method of Calculation.

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 to be established at Lot 2 DP1264030, Hillvue Road, South Tamworth, NSW, which is located in a predominantly residential area. The project site is bound to the north, south and east by residential receivers. West of the site across Hillvue Road there are several active recreation receivers, an education receiver and a passive active recreation receiver.

The ambient noise environment surrounding the project is dominated by local traffic and environmental sources. The project proposes the development of a new medical centre which will consist of the following elements:

- Medical Centre (Main Building)
 - Consulting rooms;
 - Office spaces and training rooms;
 - Pharmacy;
 - Admin and meeting spaces;
 - Public and staff amenities; and
 - Utility spaces.
- Allied health building
 - One dental tenancy;
 - Two open area tenancies; and
 - Amenities rooms.
- Wellbeing centre
 - Multipurpose room;
 - Kitchen;
 - Store rooms; and
 - Amenities.
- Open air carpark; and
- Refuse area.

Appendix B presents site plans for the project. The project proposes to operate 8.30am to 5.30pm Monday to Wednesday and Fridays, from 8.30am to 8pm on Thursdays and from 8.30am to 2pm on Saturdays. The project will be closed on Sundays and public holidays.

2.1.1 Receiver Review

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

Table 1 Receiver Locations

Receiver	Receiver Type	Receiver Height	Coordinates (MGA56)	
			Easting	Northing
R01	Residential	1.5m	301226	6556369
R02	Residential	1.5m	301243	6556378
R03	Residential	1.5m	301261	6556366
R04	Residential	1.5m	301286	6556373
R05	Residential	1.5m	301297	6556371
R06	Residential	1.5m	301318	6556376
R07	Residential	1.5m	301335	6556378
R08	Residential	1.5m	301355	6556378
R09	Residential	1.5m	301373	6556375
R10	Residential	1.5m	301391	6556378
R11	Residential	1.5m	301410	6556386
R12	Residential	1.5m	301426	6556382
R13	Residential	1.5m	301442	6556384
R14	Residential	1.5m	301459	6556386
R15	Residential	1.5m	301475	6556378
R16	Residential	1.5m	301474	6556395
R17	Residential	1.5m	301524	6556388
R18	Residential	1.5m	301521	6556418
R19	Residential	1.5m	301474	6556428
R20	Residential	1.5m	301468	6556447
R21	Residential	1.5m	301443	6556443
R22	Residential	1.5m	301431	6556452
R23	Residential	1.5m	301410	6556450
R24	Residential	1.5m	301392	6556450
R25	Residential	1.5m	301376	6556456
R26	Residential	1.5m	301359	6556454
R27	Residential	1.5m	301336	6556447
R28	Residential	1.5m	301318	6556463
R29	Residential	1.5m	301301	6556468
R30	Residential	1.5m	301286	6556467
R31	Residential	1.5m	301268	6556475
R32	Residential	1.5m	301242	6556477
R33	Residential	1.5m	301224	6556480

Table 1 Receiver Locations

Receiver	Receiver Type	Receiver Height	Coordinates (MGA56)	
			Easting	Northing
R34	Residential	1.5m	301194	6556531
R35	Residential	1.5m	301211	6556387
AR01	Active Recreational	1.5m	301142	6556478
AR02	Active Recreational	1.5m	301161	6556401
ED01	Educational	1.5m	301061	6556435
PR01	Passive Recreational	1.5m	301120	6556531

2.2 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 2** provides a summary of project noise sources and the assessment period in which they propose to occur.

Table 2 Noise Generating Activities

Activity/Source	Period ¹	Operational
Carpark light vehicles	Day	✓
	Evening	✓
	Night	X
Outdoor gathering spaces	Day	✓
	Evening	✓
	Night	X
Mechanical and ventilation plant	Day	✓
	Evening	✓
	Night	X
Waste collection	Day	✓
	Evening	✓
	Night	X

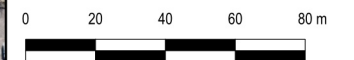
Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

FIGURE 1
Locality Plan
MAC231898-01
Tamworth Medical Centre



KEY

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



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 determined parameter 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. The measured RBLs relevant to the project are contained in **Section 4**.

3.1.3 Project Intrusiveness Noise Level (PINL)

The PINL ($L_{Aeq}(15min)$) 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.

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).

The recommended Amenity Noise Levels as per Table 2.2 of the NPI are reproduced in **Table 3**.

Table 3 Amenity Noise Levels

Receiver Type	Noise Amenity Area	Time of day ¹	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 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.

Notes: 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.

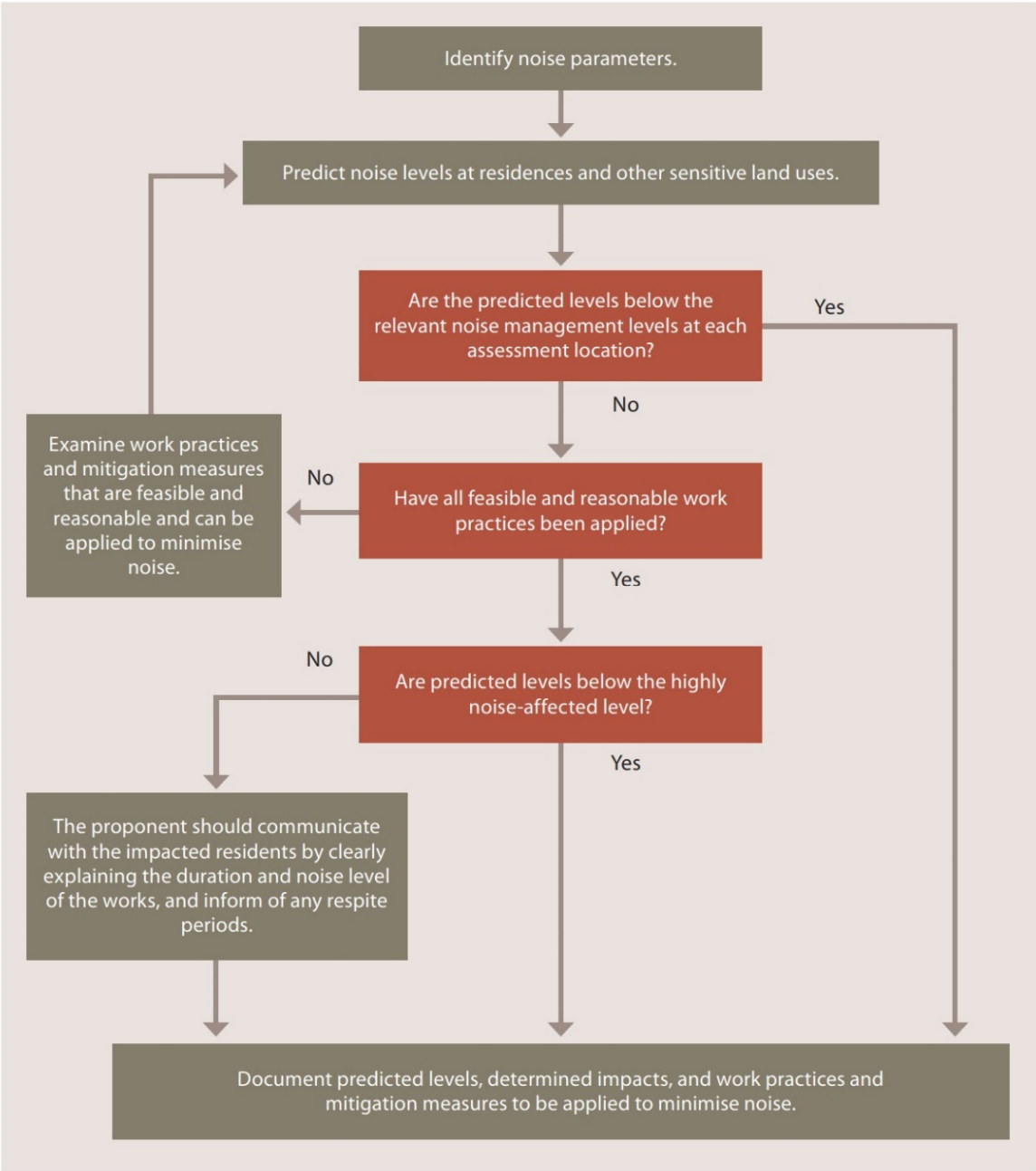
3.2 Interim Construction Noise Guideline

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.

3.2.1 Standard Hours for Construction

Table 4 presents the ICNG recommended standard hours for construction works.

Table 4 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.

3.2.2 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 5** 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 5 Noise Management Levels

Time of Day	Management Level LAeq(15min) ¹	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.

3.2.3 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 6**, which may be adopted for the project.

Table 6 Standard Mitigation Measures

	Action Required	Details
Management Measures	Implement community consultation or notification measures	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: - website (If required); - contact telephone number for community; - email distribution list (if required); and/or - community drop-in session (if required by approval conditions).
	Site Inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: - all relevant project specific and standard noise and vibration mitigation measures; - relevant licence and approval conditions; - permissible hours of work; - any limitations on noise generating activities; - location of nearest sensitive receivers; - construction employee parking areas; - designated loading/unloading areas and procedures; - site opening/closing times (including deliveries); and - environmental incident procedures.
Site Controls	Minimise disturbance arising from delivery of goods to construction sites	Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out of hours movements where possible.
	Shield stationary noise sources	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.
Path Controls	Shield sensitive receivers from noise activities	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.

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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 Standards Australia AS 1055:2018, "Acoustics – Description and Measurement of Environmental Noise".

The measurements were carried out using one Svantek 977 noise analyser from Tuesday 15 October 2024 to Thursday 24 October 2024. All acoustic instrumentation used carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022) 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 ± 0.5 dBA.

Observations on-site identified the surrounding locality was typical of a suburban environment, with traffic noise as the dominant noise source.

Data affected by adverse meteorological conditions have been excluded from the results in accordance with methodologies provided in Fact Sheet A4 of the NPI. Residential receivers situated in the surrounding area have been classified under the EPA's suburban amenity category. This criterion is used in conjunction with the intrusiveness criteria to determine the limiting criteria. The results of long-term unattended noise monitoring are provided in **Table 7**. The noise monitoring charts, and a summary of the background monitoring data are provided in **Table C18** in **Appendix C**.

Table 7 Background Noise Monitoring Summary

Monitoring Location	Period ¹	Measured Background	Measured
		Noise Level (LA90) dB RBL	dB LAeq
L1	Day	43	64
	Evening	39	55
	Night	31	60

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 Tamworth Airport AWS (31.07°S 150.84°E 395m 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 project, 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 ± 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 15 October 2024 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 8**.

Table 8 Operator-Attended Noise Survey Results

Date/Time (hrs)	Noise Descriptor (dBA re 20 μ Pa)			Meteorology	Description and SPL, dBA
	L _{Amax}	L _{Aeq}	L _{A90}		
15/10/2024				WD: SE	Traffic 40-62
13:37	75	55	45	WS: 1.9m/s	Birds 50-75
				Rain: Nil	Aircraft 40-51

5 Assessment Criteria

5.1 Operational Noise Trigger Levels (Criteria)

This section outlines the determination of Project Noise Trigger Levels in accordance with NPI methodology.

5.1.1 Intrusiveness Noise Levels

The PINL for the project are presented in **Table 9** and have been determined based on the RBL +5dBA and only apply to residential receivers.

Table 9 Project Intrusiveness Noise Levels

Location	Receiver Type	Period ¹	Measured RBL	PINL
			dB LA90	dB LAeq(15min)
L1	Residential	Day	43	48
		Evening	39	44
		Night	31	36

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.

5.1.2 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 10**. 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 10 Determination of NPI Residential Receiver Category

Receiver/Location/Catchment	Rural	Suburban	Urban
L1	0	9	0

Observations at locations in the surrounding locality support the assessment of the receiver as a suburban residential category.

5.1.3 Amenity Noise Levels and Project Amenity Noise Levels

The PANL for residential receivers and other receiver types (ie non-residential) potentially affected by the project are presented in **Table 11**.

Table 11 Amenity Noise Levels and Project Amenity Noise Levels

Receiver Type	Noise Amenity Area	Assessment Period ¹	NPI		
			Recommended	ANL	PANL
			ANL dB LAeq(period)	dB LAeq(period)	dB LAeq(15min) ²
Residential	Suburban	Day	55	55	58
		Evening	45	45	48
		Night	40	40	43
Educational	All	When in use	35 (internal 1 hr)	35 (internal 1 hr)	38 (internal 1 hr) 48 (external 1 hr) ³
Passive Recreation	All	When in use	50	50	53
Active Recreation	All	When in use	55	55	58

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: 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.

Note 3: External level based on 10dB with windows open for adequate ventilation (NPI).

5.1.4 Project Noise Trigger Levels

The PNTL are the lower of either the PINL or the PANL. **Table 12** presents the derivation of the PNTLs in accordance with the methodologies outlined in the NPI.

Table 12 Project Noise Trigger Levels

Receiver Type	Noise Amenity Area	Assessment Period ¹	PINL	PANL	PNTL
			dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
Residential	Suburban	Day	48	58	48
		Evening	44	48	44
		Night	36	43	36
Educational	All	Noisiest 1 hour period	N/A	38 (internal 1 hr) 48 (external 1 hr) ²	38 (internal 1 hr) 48 (external 1 hr) ²
Passive Recreation	All	When in Use	N/A	53	53
Active Recreation	All	When in Use	N/A	58	58

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: External level based on 10dB with windows open for adequate ventilation (NPI).

5.2 Construction Noise Management Levels

The relevant Noise Management Levels (NMLs) for standard construction hours are presented in Table 13.

Table 13 Construction Noise Management Levels			
Catchment (No) Receiver ID	Assessment Period ¹	Adopted RBL dB LA90	NML dB LAeq(15min)
Residential	Standard Hours	43	53 (RBL+10dBA)
Educational	When in use	N/A	45 (internal)
			55 (external) ²
Passive Recreation Areas	When in use	N/A	60 (external)
Active Recreation Areas	When in use	N/A	65 (external)

Note 1: Refer to Table 4 for Standard Recommended Hours for Construction.

Note 2: External level based on 10dB with windows open for adequate ventilation (ICNG).

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6 Modelling Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2024.1) 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 CONCAWE¹. 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.

6.1 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 barrier attenuation provided by the project buildings orientation;
- outdoor gather activities take place in the allocated communal spaces within the project;
- construction of a minimum 1.6m high noise barrier along the northern and southern boundary of the project site. The barrier should be constructed of material of a minimum density of 10kg/m² and not contain any gaps (see **Figure 3**); and
- the mechanical air conditioning (AC) plant is installed in the plant areas located in various positions surrounding the project buildings (see **Figure 3**).

¹ 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

6.2 Sound Power Levels

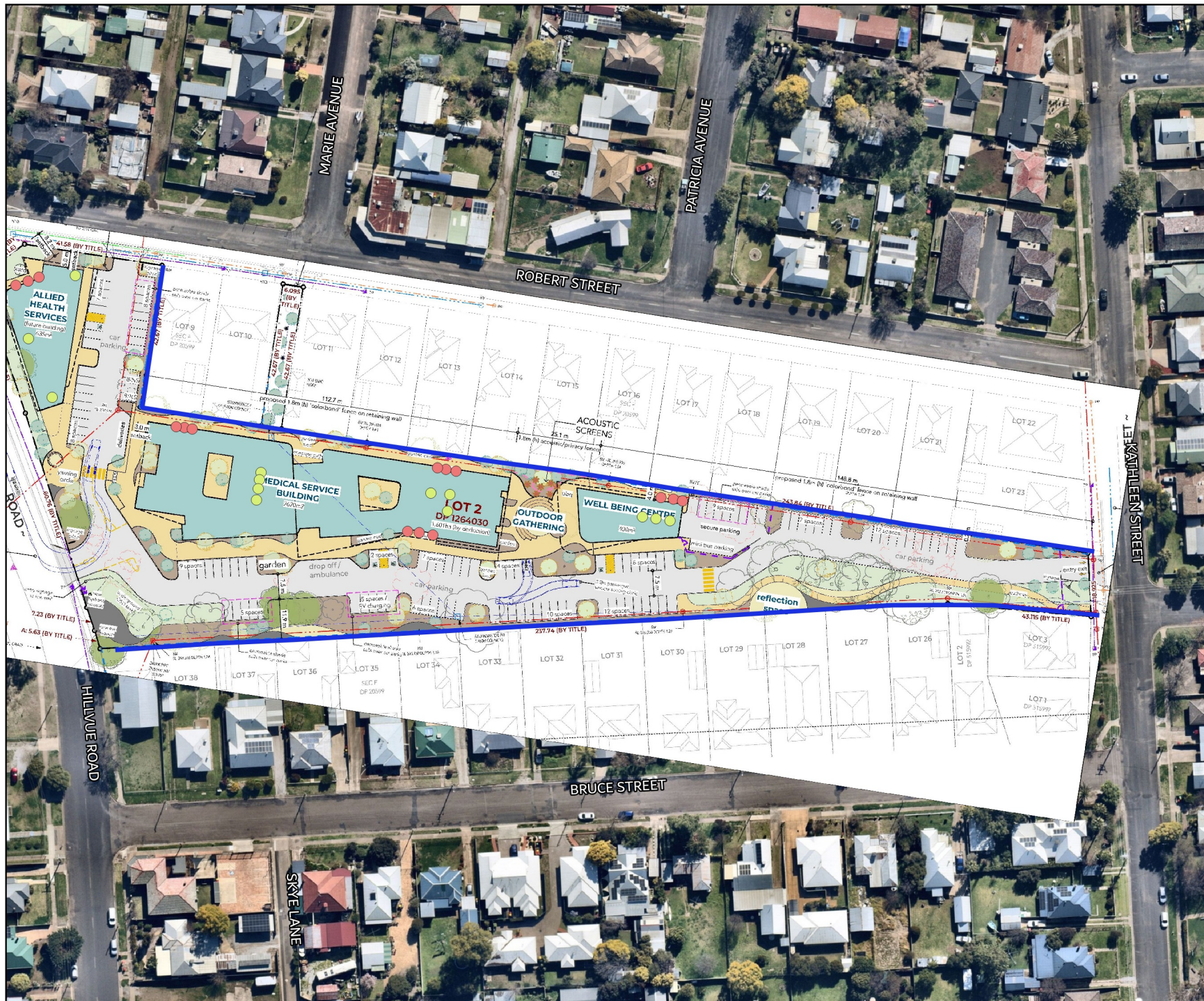
Table 14 presents the sound power level for each noise source modelled in this assessment. It is noted that sound power levels were sourced from manufacturer's specifications or from in-field measurements at similar project sites. Only high front-loading waste trucks have been considered as part of this assessment.

Table 14 Acoustically Significant Sources – Sound Power Levels dBA (<i>re 10⁻¹² Watts</i>)			
Item and quantity (per 15 minutes)	Sound Power Level dB LAeq	Total Sound Power Level dB LAeq(15min)	Source Height ¹
Operational			
Extractor Fan (x13)	73	84	0.3m
AC Plant (x15)	76	88	1.0m
Waste Collection (x1)	86	86	2.5m
Waste Vehicles travelling through Car Park (1 vehicle per 15min) ³	85	85	1.0m
Light Vehicle, start up and drive off (x60) ²	81	91	0.5m
Light vehicles travelling through Car Park (60 cars per 15min) ²	81	91	0.5m
Group of 20 Patrons in Yarning Circle (x1)	78	78	1.5m
Group of 20 Patrons in Outdoor Gathering Area (x1)	78	78	1.5m
Construction Fleet			
Combined Construction Fleet		108	1.5m

Note 1: Height above the relative ground or building below source.

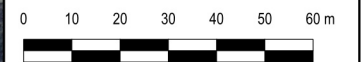
Note 2: Includes a duration adjustment assuming vehicles operate for three (3) minutes continuously within a period of 15-minutes.

FIGURE 3
Plant and Barrier Plan
MAC231898-01
Tamworth Medical Centre



KEY

- 1.6m High Acoustic Barrier
- Ventillation Fan Location
- AC Plant Location



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7 Noise Assessment Results

7.1 Operational Noise Assessment

Noise predictions from all project 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 LAeq(15min) contribution of sources which were derived from manufacturer's specifications or from in-field measurements of project sources or activities.

Results of the noise modelling predictions are presented in **Table 15** for operations without waste collection during the day and evening periods.

Table 15 Operational Noise Predictions without Waste Collection – All Receivers

Residential Receivers					
Receiver No	Predicted Noise Level		PNTL		Compliant
	dB LAeq(15min)		dB LAeq(15min)		
	Day	Evening	Day	Evening	
R01	38	38	48	44	✓
R02	40	40	48	44	✓
R03	38	38	48	44	✓
R04	40	40	48	44	✓
R05	39	39	48	44	✓
R06	40	40	48	44	✓
R07	40	40	48	44	✓
R08	40	40	48	44	✓
R09	39	39	48	44	✓
R10	40	40	48	44	✓
R11	39	39	48	44	✓
R12	38	38	48	44	✓
R13	38	38	48	44	✓
R14	38	38	48	44	✓
R15	34	34	48	44	✓
R16	39	39	48	44	✓
R17	33	33	48	44	✓
R18	35	35	48	44	✓
R19	38	38	48	44	✓
R20	35	35	48	44	✓
R21	38	38	48	44	✓

Table 15 Operational Noise Predictions without Waste Collection – All Receivers

Residential Receivers					
Receiver No	Predicted Noise Level		PNTL		Compliant
	dB LAeq(15min)		dB LAeq(15min)		
	Day	Evening	Day	Evening	
R22	37	37	48	44	✓
R23	39	39	48	44	✓
R24	40	40	48	44	✓
R25	40	40	48	44	✓
R26	41	41	48	44	✓
R27	41	41	48	44	✓
R28	39	39	48	44	✓
R29	38	38	48	44	✓
R30	37	37	48	44	✓
R31	37	37	48	44	✓
R32	39	39	48	44	✓
R33	41	41	48	44	✓
R34	39	39	48	44	✓
R35	39	39	48	44	✓
Other Receivers					
Receiver No	Period	Predicted Noise Level	PNTL	Compliant	
		dB LAeq(15min)	dB LAeq(15min)		
AR01	When in use	37	58	✓	
AR02	When in use	35	58	✓	
ED01	When in use	35	48	✓	
PR01	When in use	38	53	✓	

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

Waste collections are expected to be undertaken once in a 24-hour period during the day or evening. Waste collection usually takes several minutes, but to present a conservative assessment, it has been assumed that it would take up to 15 minutes to complete. Fact Sheet C of the NPI allows for exceedance of the PNTL or adjustment of the PNTL for short term single events that may occur in any 24-hour period. Table C3 of the NPI allows an adjustment to the PNTL of +7dB for the daytime and evening periods when the event is expected to occur. Results of the noise modelling predictions are presented in **Table 16** for operations with waste collection during the daytime and evening periods.

Table 16 Operational Noise Predictions with Waste Collection – All Receivers

Residential Receivers					
Receiver No	Predicted Noise Level		PNTL		Compliant
	dB LAeq(15min)		dB LAeq(15min)		
	Day	Evening	Day	Evening	
R01	39	39	55	51	✓
R02	41	41	55	51	✓
R03	38	38	55	51	✓
R04	40	40	55	51	✓
R05	39	39	55	51	✓
R06	40	40	55	51	✓
R07	40	40	55	51	✓
R08	40	40	55	51	✓
R09	39	39	55	51	✓
R10	40	40	55	51	✓
R11	39	39	55	51	✓
R12	38	38	55	51	✓
R13	38	38	55	51	✓
R14	38	38	55	51	✓
R15	34	34	55	51	✓
R16	39	39	55	51	✓
R17	33	33	55	51	✓
R18	35	35	55	51	✓
R19	38	38	55	51	✓
R20	35	35	55	51	✓
R21	38	38	55	51	✓
R22	37	37	55	51	✓
R23	39	39	55	51	✓
R24	40	40	55	51	✓
R25	40	40	55	51	✓

Table 16 Operational Noise Predictions with Waste Collection – All Receivers

Residential Receivers					
Receiver No	Predicted Noise Level		PNTL		Compliant
	dB LAeq(15min)		dB LAeq(15min)		
	Day	Evening	Day	Evening	
R26	41	41	55	51	✓
R27	42	42	55	51	✓
R28	39	39	55	51	✓
R29	39	39	55	51	✓
R30	39	39	55	51	✓
R31	41	41	55	51	✓
R32	43	43	55	51	✓
R33	45	45	55	51	✓
R34	40	40	55	51	✓
R35	40	40	55	51	✓
Other Receivers					
Receiver No	Period	Predicted Noise Level	PNTL	Compliant	
		dB LAeq(15min)	dB LAeq(15min)		
AR01	When in use	37	65	✓	
AR02	When in use	35	65	✓	
ED01	When in use	35	55	✓	
PR01	When in use	38	60	✓	

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 Construction Noise Assessment

Table 17 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 may be above the Construction NMLs at several of the assessed receivers. Accordingly, noise management measures are provided in **Section 8** of this report to reduce potential impacts on surrounding receivers.

Table 17 Construction Noise Levels – All Receivers

Receiver	Period ¹	Predicted Noise Level				Management Level
		dB LAeq(15min)				
		Allied Health Services Building	Medical Service Building	Well Being Centre	Car Park	dB LAeq(15min)
R01	Day	53	60	54	46	53
R02	Day	55	62	54	49	53
R03	Day	52	59	55	51	53
R04	Day	53	60	57	50	53
R05	Day	50	58	56	50	53
R06	Day	50	57	60	53	53
R07	Day	49	55	60	54	53
R08	Day	51	56	61	55	53
R09	Day	48	52	60	55	53
R10	Day	49	53	61	57	53
R11	Day	46	50	58	61	53
R12	Day	46	45	57	62	53
R13	Day	47	50	57	64	53
R14	Day	46	50	56	67	53
R15	Day	<35	37	45	62	53
R16	Day	47	47	55	67	53
R17	Day	38	41	44	58	53
R18	Day	41	48	52	63	53
R19	Day	41	48	53	68	53
R20	Day	<35	48	54	66	53
R21	Day	47	50	58	67	53
R22	Day	<35	50	58	63	53
R23	Day	43	51	60	60	53
R24	Day	48	52	63	59	53
R25	Day	39	41	64	56	53
R26	Day	49	47	66	56	53
R27	Day	50	56	65	53	53
R28	Day	51	59	44	40	53
R29	Day	42	60	56	39	53
R30	Day	54	61	56	43	53
R31	Day	57	61	50	<35	53
R32	Day	59	60	52	41	53
R33	Day	62	59	52	42	53
R34	Day	65	47	41	39	53
R35	Day	54	58	51	46	53
AR01	Day	68	57	48	44	65
AR02	Day	61	59	53	49	65
ED01	Day	57	53	49	46	55
PR01	Day	62	50	44	39	60

Note 1: Refer to Table 4 for Standard Recommended Hours for Construction.

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8 Construction Recommendations

The results of the Noise Assessment identify that levels during standard construction hours are above the ICNG noise management levels at surrounding residential receivers to the project. Accordingly, it is recommended that noise management and mitigation measures be adopted during noise intensive construction activities to limit impacts on surrounding receivers.

Recommendations for consideration during construction activities for this project may include:

- implement boundary fences/retaining walls as early as possible to maximise their attenuation benefits to surrounding receivers;
- toolbox and induction of personnel prior to shift to discuss noise control measures that may be implemented to reduce noise emissions to the community;
- where possible use mobile screens or construction hording to act as barriers between construction works and receivers;
- all plant should be shut down when not in use. Plant to be parked/started at farthest point from relevant assessment locations;
- operating plant in a conservative manner (no over-revving);
- selection of the quietest suitable machinery available for each activity;
- avoidance of noisy plant/machinery working simultaneously where practicable;
- minimisation of metallic impact noise;
- all plant are to utilise a broadband reverse alarm in lieu of the traditional hi frequency type reverse alarm; and
- undertake letter box drops to notify receivers of potential works.

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9 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Assessment to quantify emissions from proposed Medical Centre Development (the project) to be located at Lot 2 DP1264030, Hillvue Road, South Tamworth, NSW.

The assessment has quantified potential project emissions pertaining to project generated noise, including light vehicles, waste collections and mechanical plant. The results of the Noise Assessment demonstrate that noise emissions from the project would satisfy the relevant PNTLs at all assessed receivers for all assessment periods once noise controls for the project are implemented (see **Section 6.1**):

- the project is constructed as per the site design and plans (as presented in **Appendix B**) which includes the barrier attenuation provided by the project buildings orientation;
- outdoor gather activities take place in the allocated communal spaces within the project;
- construction of a minimum 1.6m high noise barrier along the northern and southern boundary of the project site. The barrier should be constructed of material of a minimum density of 10kg/m^2 and not contain any gaps (see **Figure 3**); and
- the mechanical air conditioning (AC) plant is installed in the plant areas located in various positions surrounding the project buildings (see **Figure 3**).

Modelled noise emissions from construction activities identify that predicted noise emissions may be above the applicable construction management levels at several assessed receivers. Accordingly, noise management measures are provided in **Section 8** of this report to reduce potential impacts on surrounding receivers.

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**.

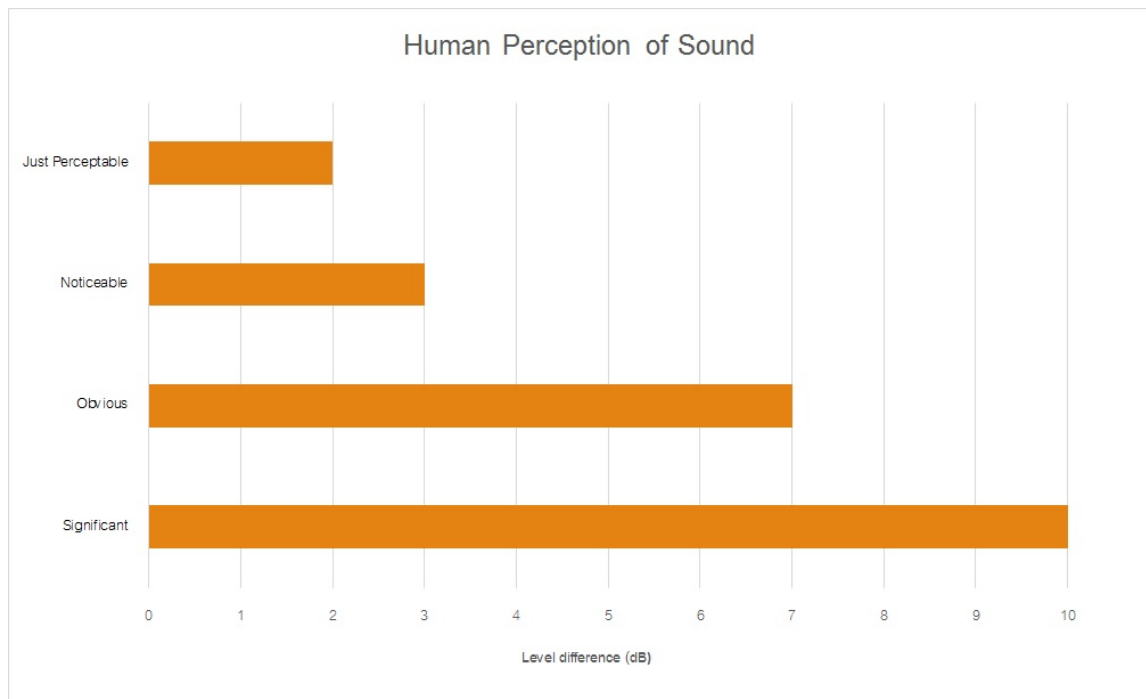
Table A1 Glossary of Acoustical Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI 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

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LOCALITY PLAN.



hillvue road, south tamworth nsw 2340

lot 2, dp1264030

DRAWING SCHEDULE.

A C1	COVER SHEET	REV B	DATED 29.05.2023
A C2	SITE PLAN	REV B	DATED 29.05.2023
A C3	MEDICAL CENTRE PLAN	REV B	DATED 29.05.2023
A C4	WELL BEING CENTRE PLAN	REV B	DATED 29.05.2023
A C5	ALLIED HEALTH SERVICES	REV B	DATED 29.05.2023

PROJECT DESCRIPTION.

For the purpose of the Building Code of Australia, Vol. 1, 2019, the development may be described as follows:

classification - BCA 'part A6'
The medical service building has been classified as a 'Class 9a' building - health care building
The Professional tenancies building has been classified as a 'Class 9a' building - health care building
The Well being Centre has been classified as a 'Class 9b' building - assembly building

rise in stories - BCA 'part C1.2'
The building has a rise in stories of one.

effective height - BCA 'schedule 3 definitions'
The building has an effective height of zero, ie less than 25.0m.

type of construction required - BCA 'part A6, part C1.1 - table C1.1'
Class 9a building - Type 'C' construction. The building has been deemed 'conditioned' excluding the toilets & airlocks.

climate zone - BCA 'schedule 3 definitions'
The building is located within climate zone 4.

GENERAL NOTES.

In addition to the National Construction Code series, Building Code of Australia Vol. 1, 2019, the Plumbing Code of Australia, 2019 & 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
AS2900.6 - Off-street parking; mandatory requirements
AS1680.0 - Interior lighting - safe movement
Children (Education & Care Services) Regulation 2011

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.

DRAFT ONLY - NOT TO BE CONSTRUCTED



01 SITE LAYOUT
Scale 1:500 @ A1
0 5000 10000 20000 50000

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03

MEDICAL CENTRE FLOOR PLAN

Scale 1:150 @ A1

0

1500

3000

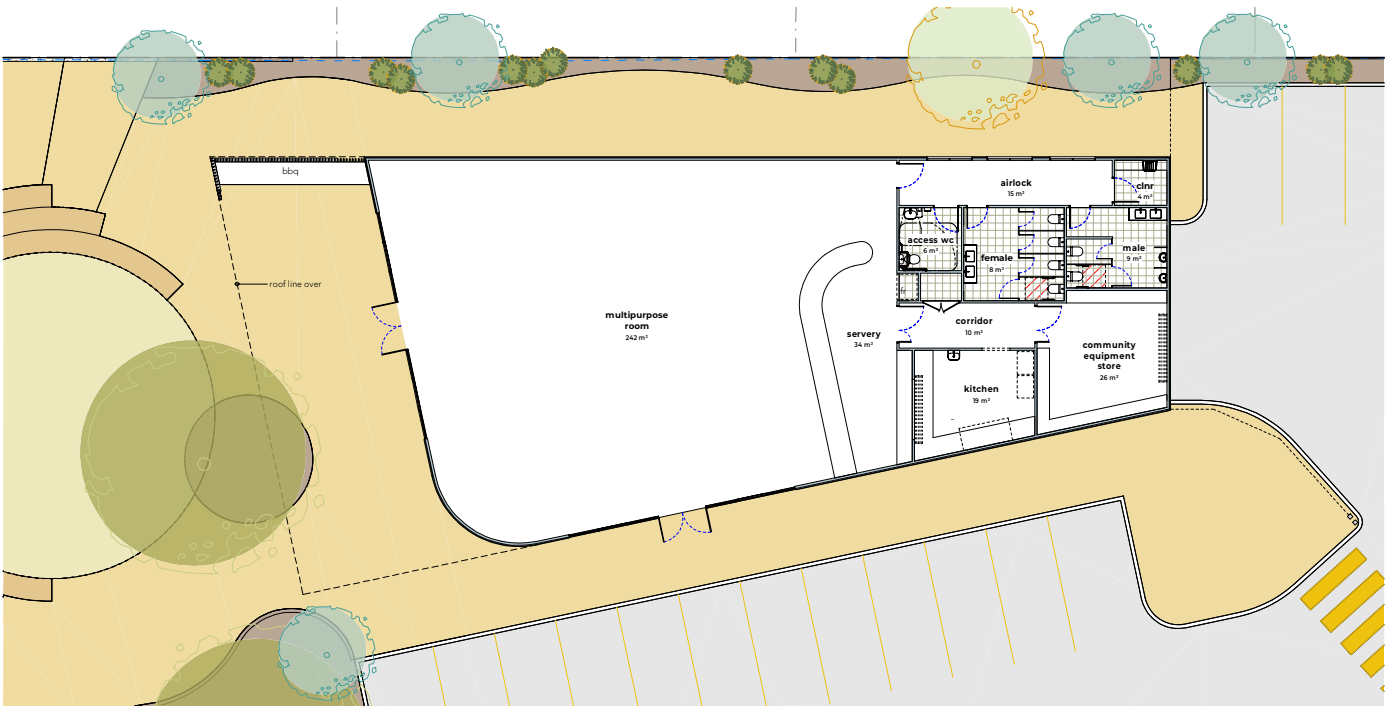
6000

15000

N

AREAS	
MEDICAL CENTRE GROSS FLOOR AREA	2400m ²
EXTERNAL PAVEMENT + INTERNAL COURTYARDS	1450m ²
STAFF NUMBERS	
CLINICAL WING	
20 consult rooms, 4 Dental Rooms, 1 pathology office, 1 office	subtotal = 26 staff
ADMINISTRATION	
Executive offices (6), Open Office (12), Admin office (3), Reception (4)	sub total = 25 staff
COUNSELLING WING	
8 Consult rooms, 1 Managers office	subtotal = 9 staff
	Total = 60 staff

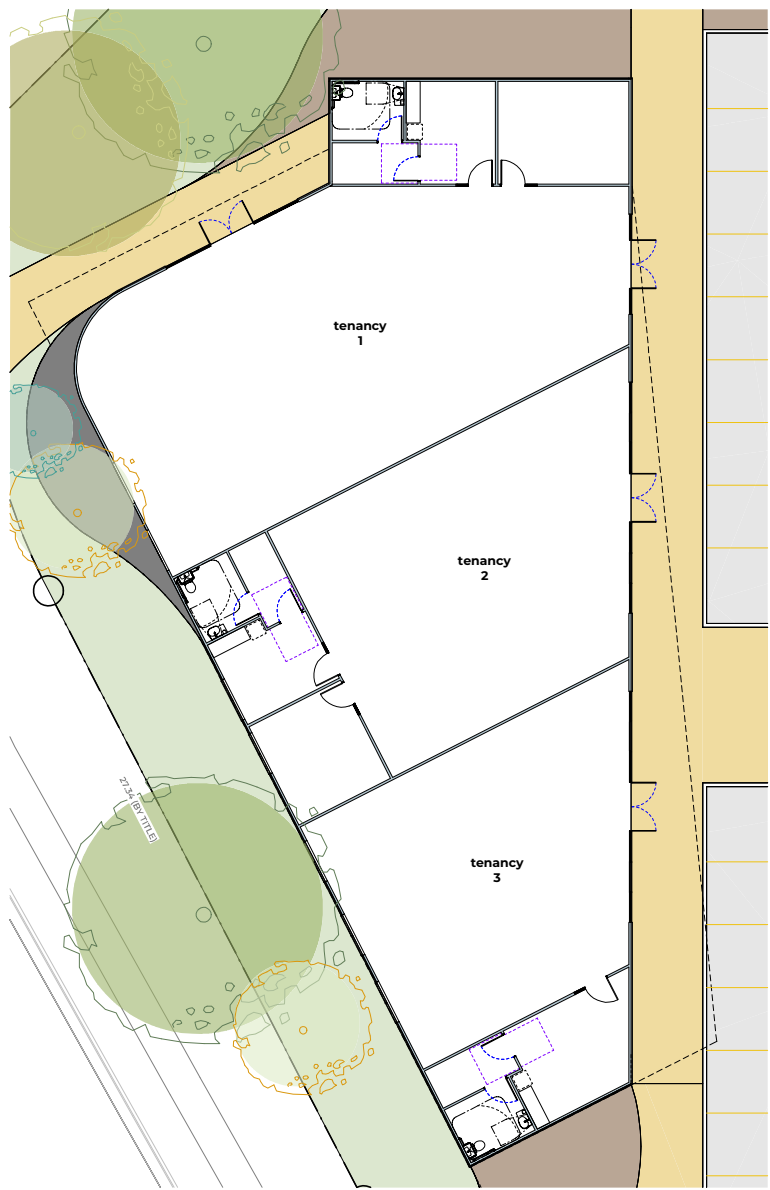
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03 WELL-BEING CENTRE FLOOR PLAN
Scale 1:100 @ A1
0 1000 2000 4000 10000



DRAFT ONLY - NOT TO BE CONSTRUCTED



04 ALLIED HEALTH SERVICES - FLOOR PLAN
Scale 1:100 @ A1
0 1000 2000 4000 10000



Appendix C – Noise Monitoring Charts and Assessment Background Levels Summary

Table C18 Background Noise Monitoring Summary – Location L1

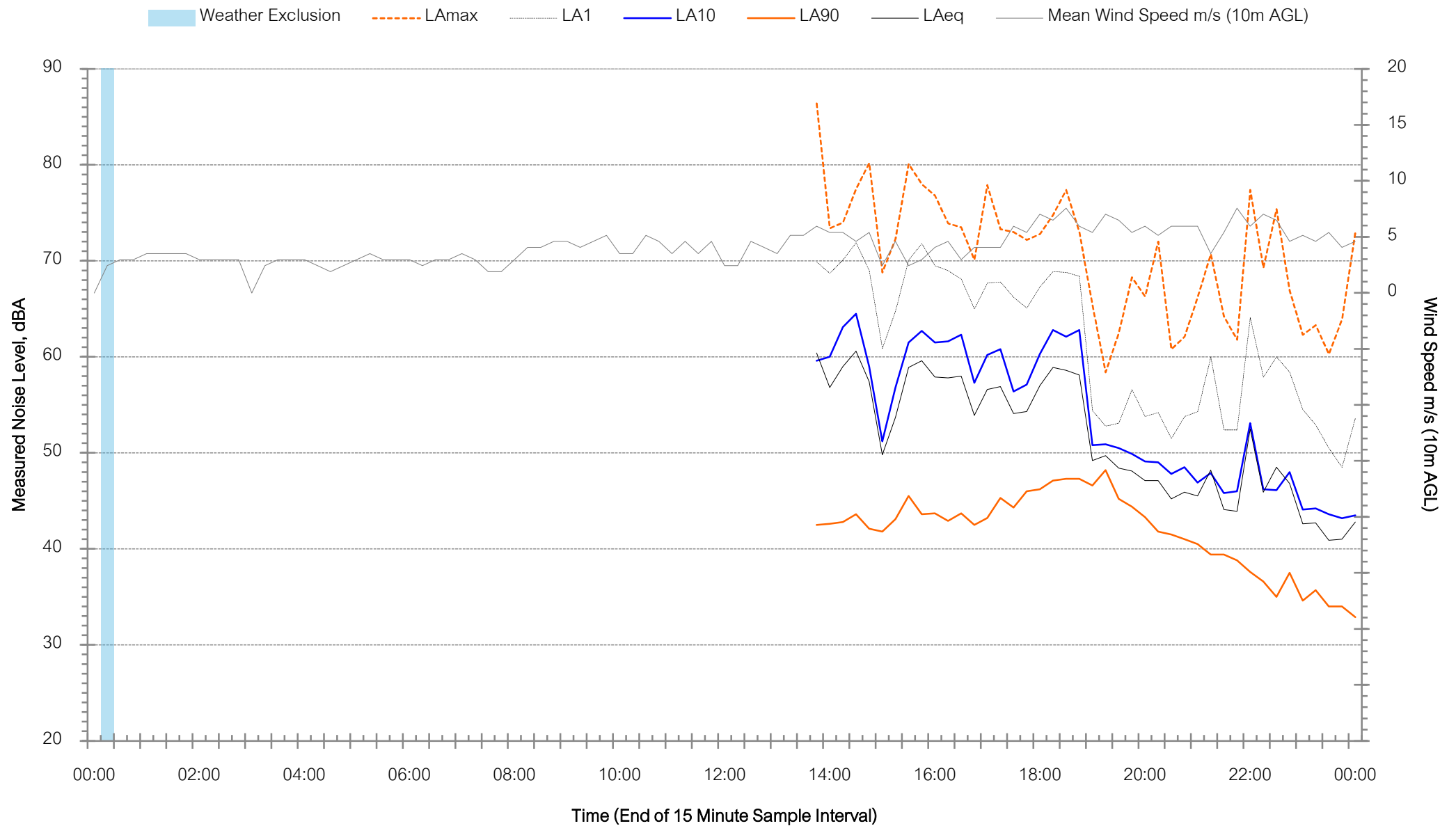
Date	Measured Background Noise Level (LA90) dB ABL ¹			Measured dB LAeq(period)		
	Day	Evening	Night	Day	Evening	Night
Tuesday 15 October 2024	--	39	31	--	53	56
Wednesday 16 October 2024	50	41	30	66	54	61
Thursday 17 October 2024	40	40	32	70	52	59
Friday 18 October 2024	46	46	37	63	60	62
Saturday 19 October 2024	44	38	32	63	56	63
Sunday 20 October 2024	43	37	30	62	55	58
Monday 21 October 2024	42	38	29	60	55	59
Tuesday 22 October 2024	40	39	35	59	53	58
Wednesday 23 October 2024	40	38	30	59	51	55
Thursday 24 October 2024	--	--	--	--	--	--
Location1 – RBL / Leq Overall	43	39	31	64	55	60

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

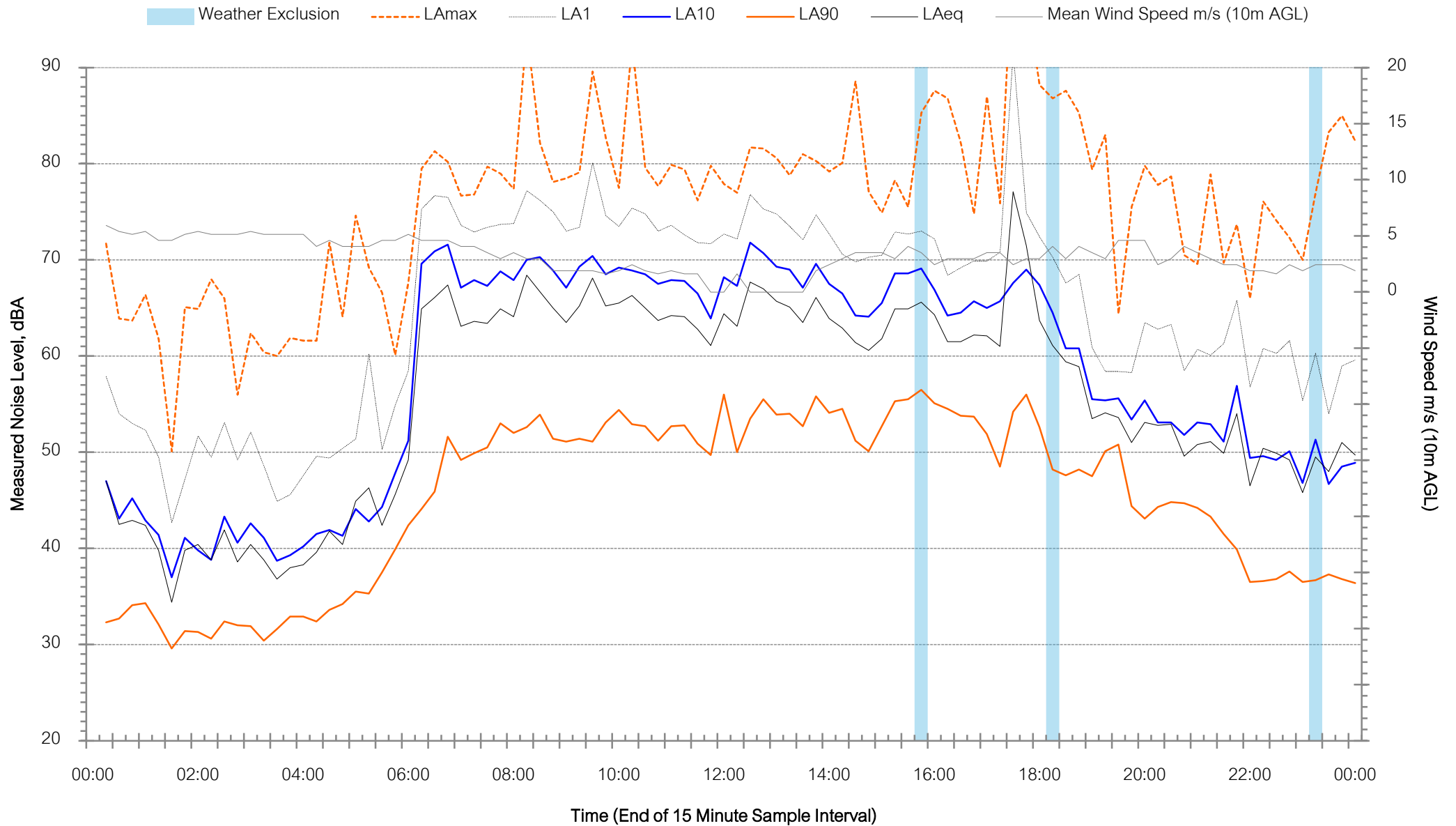
Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Tuesday 15 October 2024



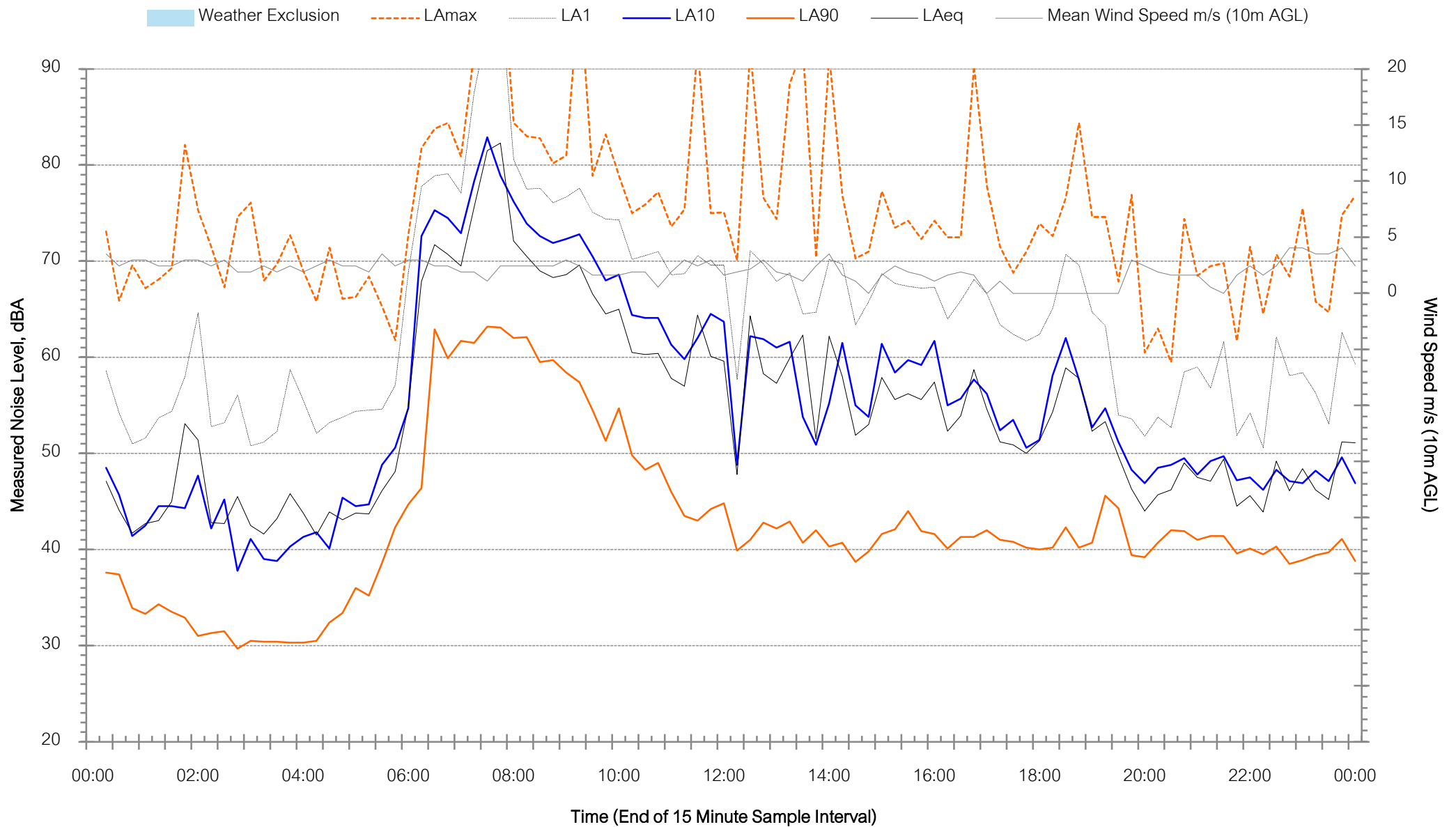
Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Wednesday 16 October 2024



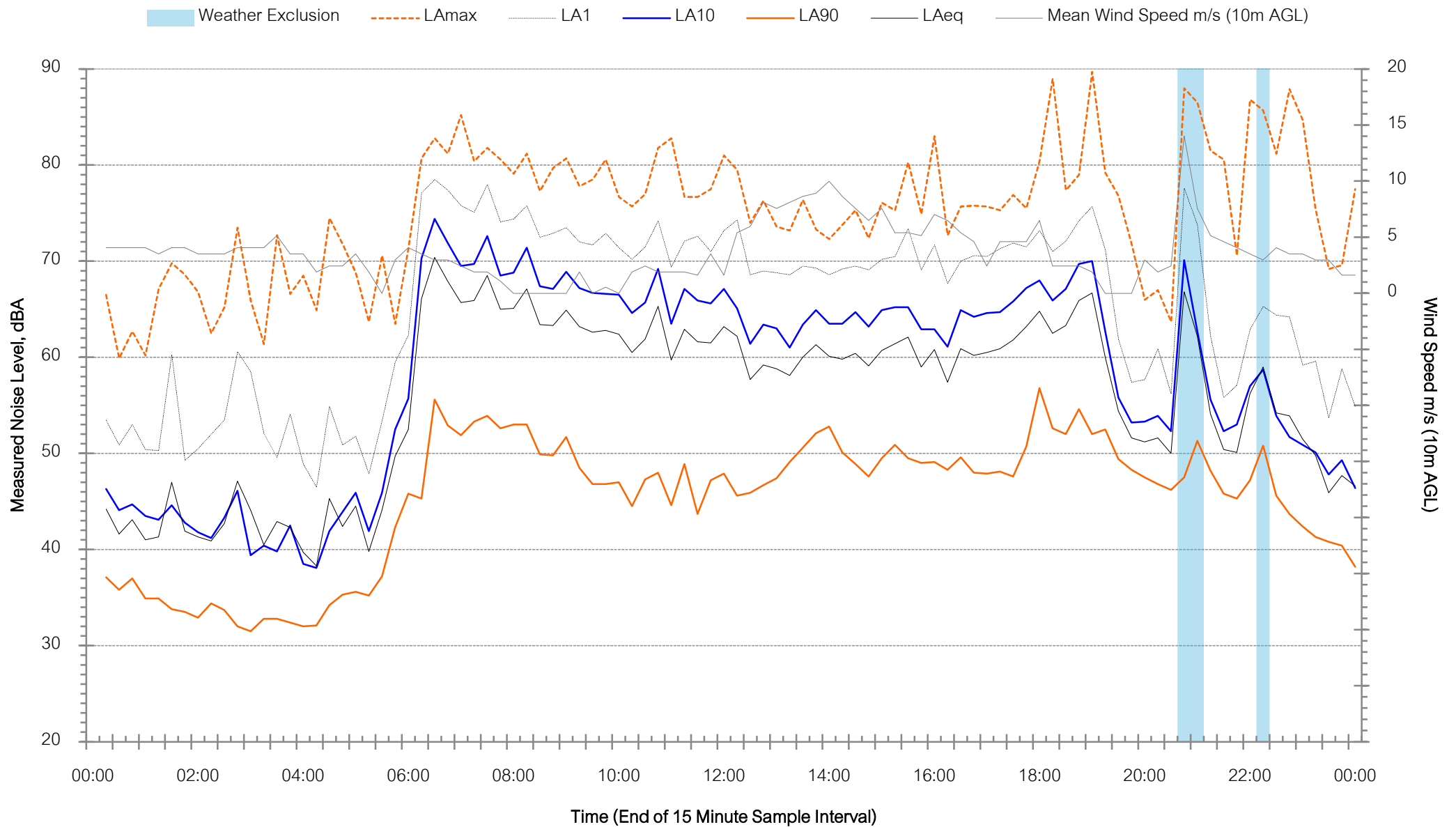
Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Thursday 17 October 2024



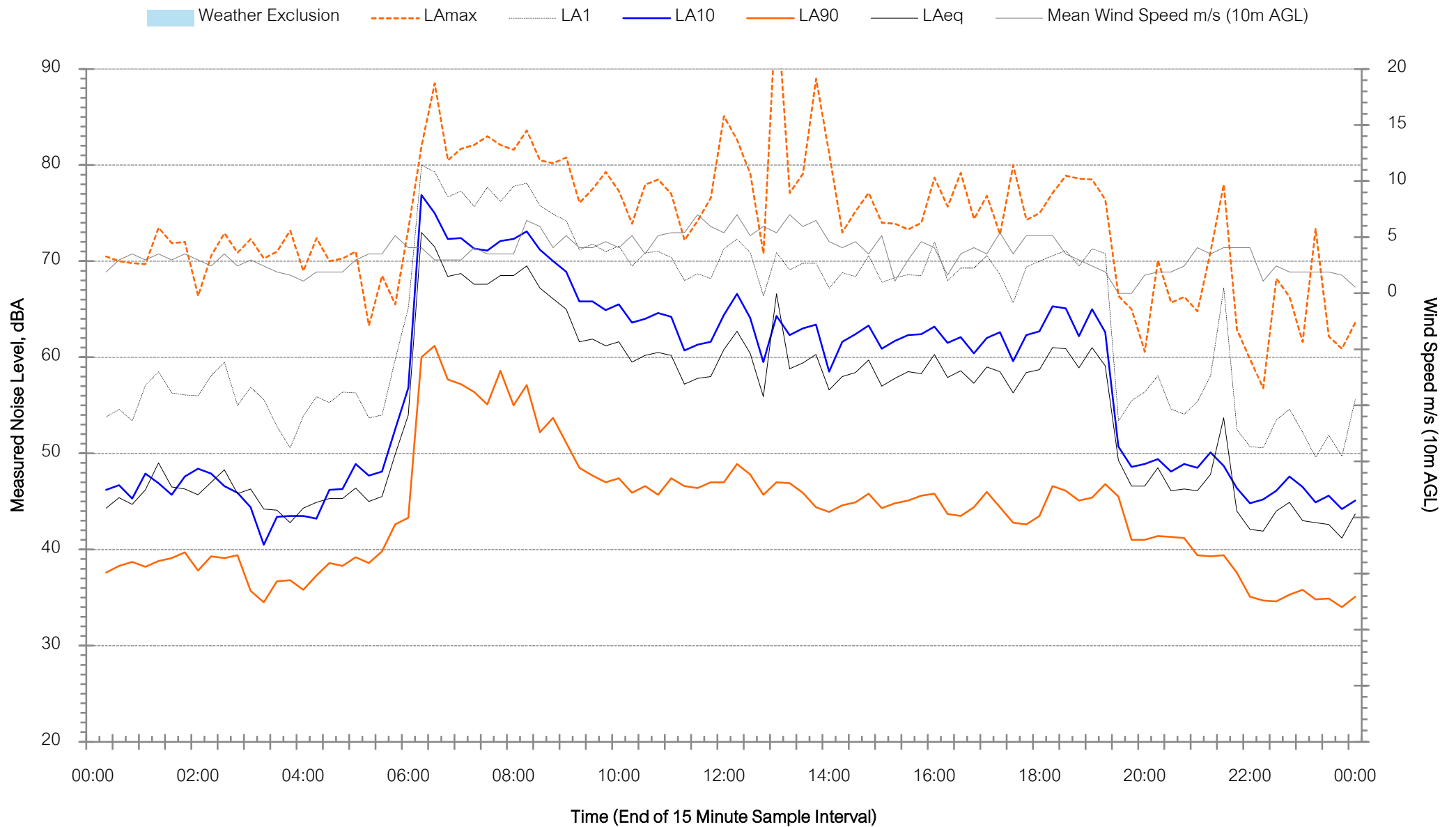
Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Friday 18 October 2024



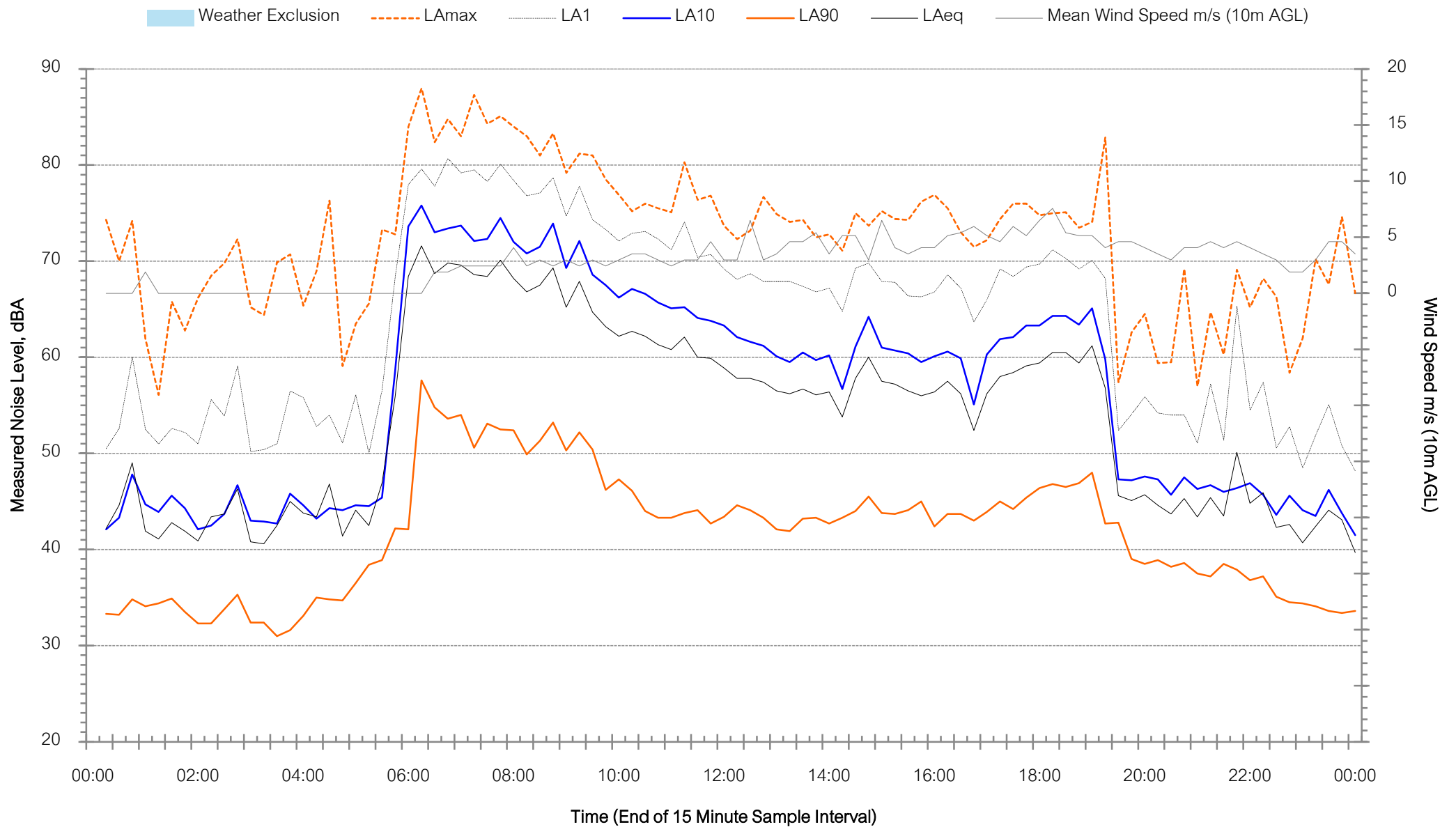
Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Saturday 19 October 2024



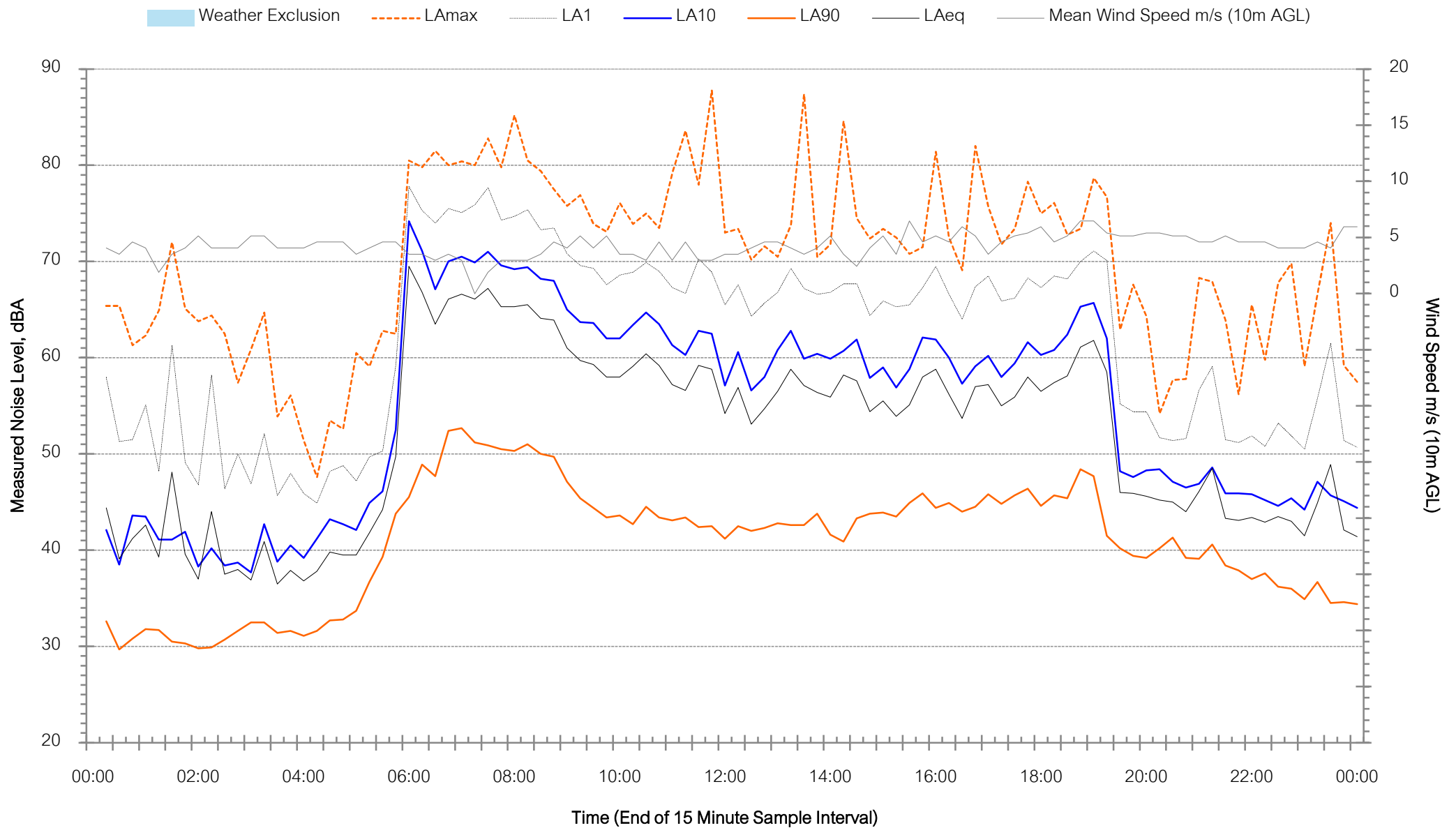
Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Sunday 20 October 2024



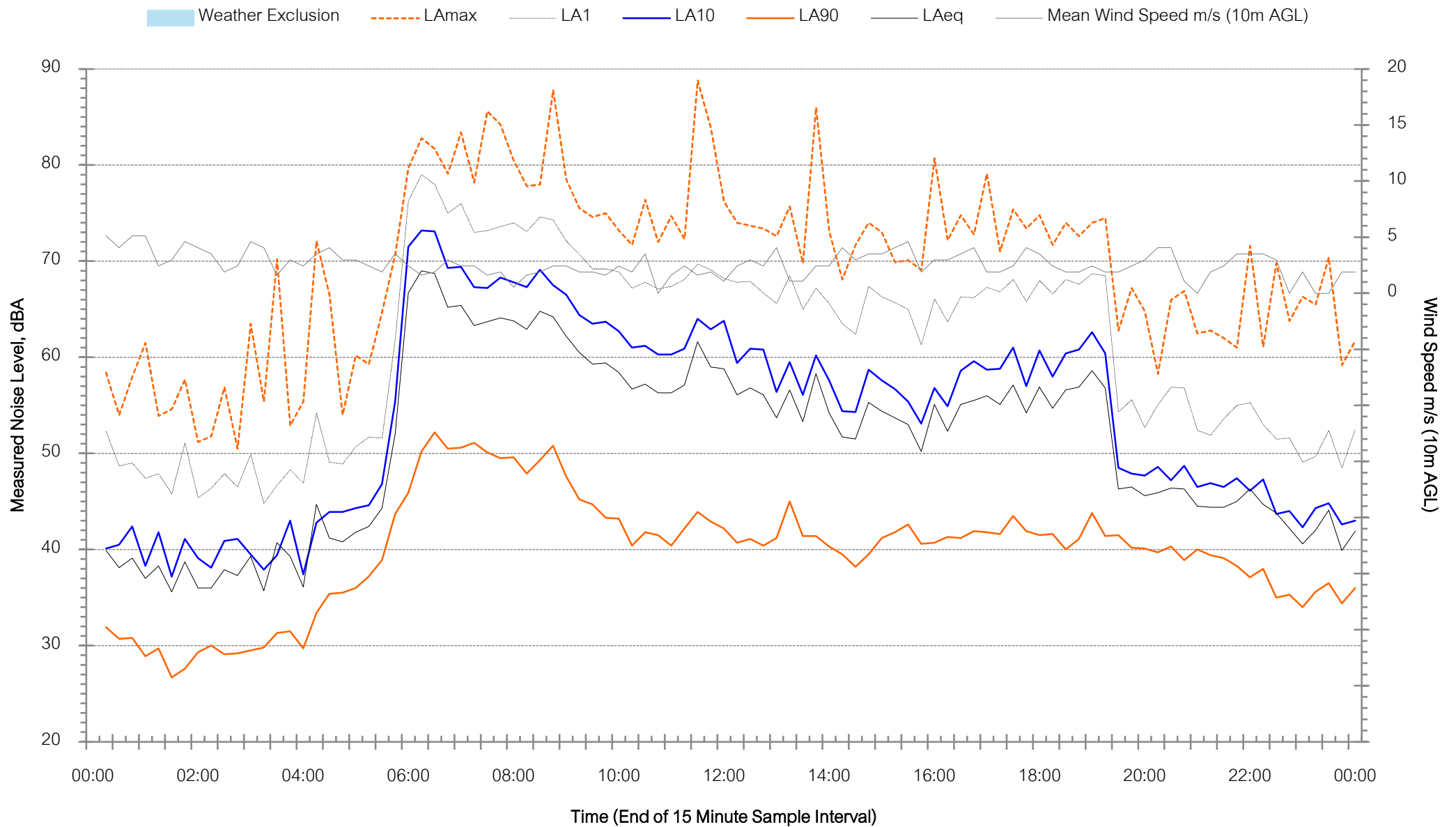
Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Monday 21 October 2024



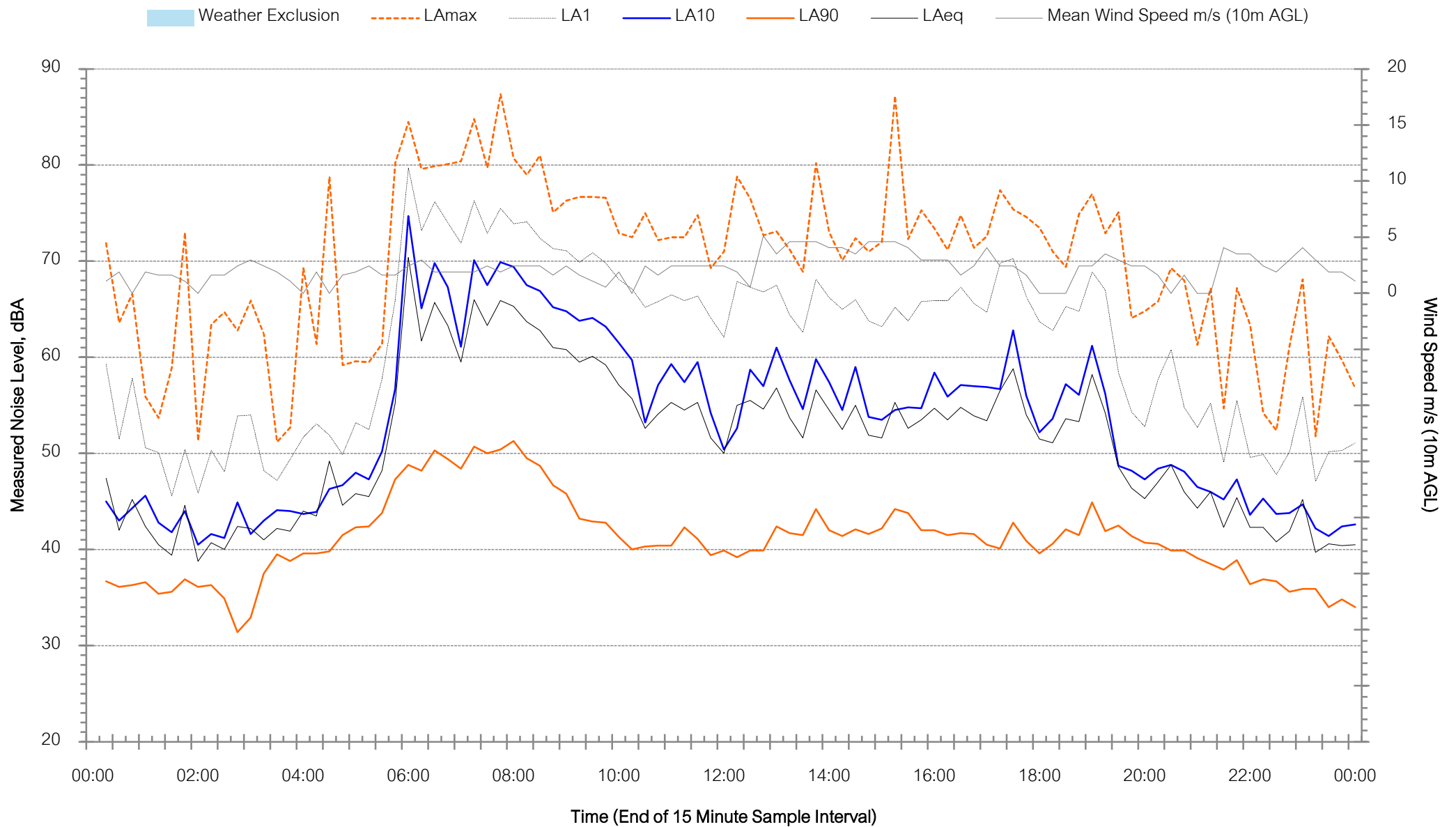
Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Tuesday 22 October 2024



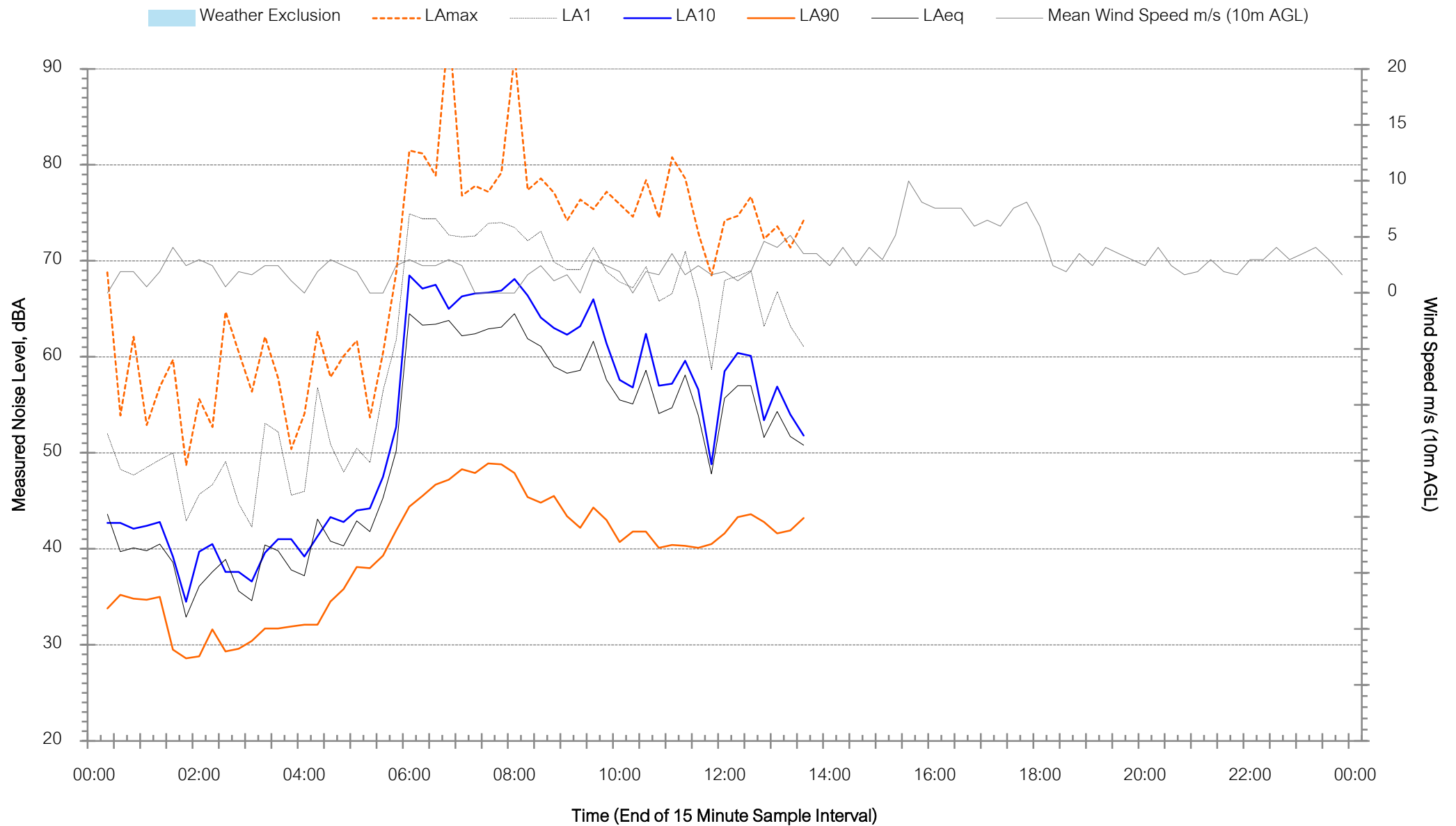
Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Wednesday 23 October 2024



Background Noise Levels

Tamworth Medical Centre, South Tamworth, NSW - Thursday 24 October 2024



Appendix D – Determination of NPI Receiver Category

Table D24 - Determination of NPI Residential Receiver Category																				
Location/ Catchment			Measured RBL dB LA90(period)			Rural	Suburban	Urban	Commercial, Industrial	Typical Existing Background Noise Levels			Rural Residential - an area with an acoustical environment				Suburban Residential - an area that has:		Urban Residential- an area with an acoustical environment	
										Table 2.3 NPI			that:				that:		that:	

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	9	0		0	3	0	0	0	0	0	3	0	3	0	0	0	0

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