Noise Assessment

Proposed Restaurant Development
40 Myoora Road
Terrey Hills, NSW

Prepared for: H&E Architects
August 2024
MAC242173-01RP1V2

Muller Acoustic Consulting

Document Information

Noise Assessment

Proposed Restaurant Development

40 Myoora Road

Terrey Hills, NSW

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by H&E Architects to prepare a Noise Assessment (NA) to quantify emissions from the proposed licensed premises development to be located at 40 Myoora Road, Terrey Hills, NSW.

The NA has quantified potential operational and sleep disturbance 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 Environment Protection Authority (EPA's), Approved Methods for the measurement and analysis of environmental noise in NSW, 2022;
- NSW Environment Protection Authority (EPA), Noise Guide for Local Government (NGLG), 2023;
- NSW Government (Liquor and Gaming), 24-Hour Economy Legislation (Vibrancy Reforms) Amendment Act 2023;
- Standards Australia AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures;
- International Standard ISO 9613:1993 - Acoustics - Attenuation of sound during propagation outdoors; and
- Association of Australasian Acoustical Consultants (AAAC) - Consultants Guideline for Report Writing, 2017.

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 located at 40 Myoora Road, Terrey Hills, NSW. The surrounding locality comprises of residential, commercial and industrial land uses.

The project is bound to the northwest by Myoora Road and southeast by Mona Vale Road, which carries approximately 42,000 vehicles per day. To southwest of the project site is a commercial premises with a commercial/industrial premises to the north. Additional commercial and industrial premises are located to the southeast of the project site. The nearest residential receivers to the project site are located to the northwest across Myoora Road and southeast facing onto Mona Vale Road.

The noise environment surrounding the project site is dominated by road traffic noise during the day period along with commercial and industrial noise from the surrounding premises and is dominated at during the evening and night by road traffic noise and wildlife noise.

The project includes the establishment of a restaurant development. The proposed operating hours of the project are 8am to 12am, seven days.

The development will compromise of three separate licensed restaurant venues with ancillary kitchens bars, outdoor dining areas, at grade and basement car parking, ancillary office premises and extensive landscaped open space including children's play equipment.

There is an outdoor stage adjacent to restaurant 2 that will accommodate amplified music performance between 12pm to 10pm.

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 1** provides a summary of operation noise sources and the assessment period in which they propose to occur.

Table 1 Noise Generating Activities

Activity/Source	Period[1]	Operational
Patrons in Internal and External Dining Areas	Day	✓
	Evening	✓
	Night	✓
Children in Playground Area	Day	✓
	Evening	✓
	Night	✓
Outdoor Amplified Music Performance	Day	✓
	Evening	✓
	Night	X
Customer Light Vehicles in External and Basement Carpark	Day	✓
	Evening	✓
	Night	✓
Mechanical Plant	Day	✓
	Evening	✓
	Night	✓
Consumable Deliveries / Waste Collection	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.

2.2.1 Receiver Review

A review of residential receivers in close proximity to the operation has been completed and are summarised in **Table 2.** Receiver heights were set at various heights representative of the surrounding receiver buildings. **Figure 1** provides a locality plan showing the position of these receivers in relation to the operation.

Table 2 Receiver Locations

Receiver	Description	Receiver Height	Coordinates (MGA56)	
			Easting	Northing
R01	Residential	1.5/4m	335021	6270845
R02	Residential	1.5/4m	335110	6270536
R03	Residential	1.5m	334914	6270706
R04	Residential	1.5m	334926	6270780
C01	Commercial	1.5m	334980	6270819
C02	Commercial	1.5m	335081	6270730
C03	Commercial	1.5m	335135	6270567
C04	Commercial	1.5/4m	335051	6270658
C05	Commercial	1.5m	334986	6270674
I01	Industrial	1.5m	335265	6270523

FIGURE 1

Locality Plan

MAC242173-01

40 Myoora Road,

Terrey Hills, NSW

KEY

- Receiver Location
- Attended Logger
- Unattended Logger
- Boundary

0 40 80 m

N

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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. The measured RBLs relevant to the project are contained in **Section 4.1**.

3.1.3 Project Intrusiveness Noise Level (PINL)

The PINL ($LA_{eq(15min)}$) 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. 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 3**.

Table 3 Amenity Noise Levels			
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

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.

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.

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 L&GNSW Disturbance Complaint Guidelines

The Disturbance Complaint Guidelines (DCG) were released by Liquor and Gaming NSW (L&GNSW) in July 2024 as part of the Vibrancy Reforms 24-Hour Economy Legislation Amendment Act enacted by the NSW Parliament in 2023.

The vibrancy reforms are designed to boost NSW's night-time economy, benefiting live music, dining, and creative sectors and workers with the aim of bringing vibrancy back to NSW's night-time economy and community. The primary objectives changes were made to facilitate licensed premises hosting live music; however, licensees also retain certain obligations to minimize the potential negative impact on local residents or businesses in the community.

The vibrancy reforms specify that as of 1 July 2024, L&GNSW are the lead regulator for addressing noise complaints under the Liquor Act with the DCG now being the primary guidance for managing noise from licensed premises.

The DCG outlines that it is reasonable to expect some level of noise or activity from licensed premises due to people arriving and leaving or in the general operation of the venue, including through amplified or live performance and entertainment sound. However, it remains that a licensee must not permit business to be conducted at their licensed premises in a way that unduly disturbs, or unreasonably and seriously disturbs, the quiet and good order of the neighborhood in which the premises are located.

3.2.1 Existing Premises

To mitigate against excessive noise from an existing venue or address issues relating to patron management or amenity concerns, L&GNSW and the Independent Liquor & Gaming Authority (the 'ILGA') may impose certain noise-related conditions on liquor licenses in response to a verified statutory disturbance complaint.

These conditions are imposed following a verified statutory disturbance complaint that has been investigated and upheld (by L&GNSW) under the Liquor Act, or if there are specific issues associated with the operation or management of a licensed premises that need to be addressed via a specific condition.

Although a license associated with a premises may not include noise-related conditions, the standard LA10[1] noise-related condition may be imposed by L&GNSW. This is to assist in the management of the premises so as not to unduly, unreasonably or seriously disturb the quiet and good order of the neighborhood in which the licensed premises are located.

[1] https://www.liquorandgaming.nsw.gov.au/community-and-stakeholders/licensed-venues/sound-regulation-in-licensed-premises/frequently-asked-questions

3.2.2 New Licensed Premises

The DCG is primarily focused on the management of noise from existing licensed premises. As proposed licensed venues, that are in the early planning stage, cannot be subject to a verified statutory disturbance, specific noise-related conditions may not be imposed upon the premises.

Liquor and Gaming state[2] that *'Licensee's have certain obligations not to conduct business in a way that unduly, or unreasonably and seriously disturbs, the quiet and good order of the neighbourhood.'* Additionally, L&GNSW strongly encourages licensee's *'follow best practice and implement responsible sound management practices within their venue'*. This practice may mitigate the likelihood of noise complaints being made against the venue in the long term.

In lieu of a formal L&GNSW criteria, the prevailing background noise levels +5dB has been adopted as the disturbance threshold for the project.

Adopting this threshold aims to limit the potential for a licensed premises to increase the overall ambient noise environment. Satisfying the threshold would minimize the likelihood of disturbance to a community as per Liquor and Gaming[1].

Should the disturbance threshold indicate that the licensed premises may potentially impact the quiet and good nature of a neighborhood, additional assessment may be undertaken including noise mitigation and management measures, outlined in the DCG, may be implemented to assist in future management of noise emissions from the premises.

3.3 Interim Construction Noise Guideline

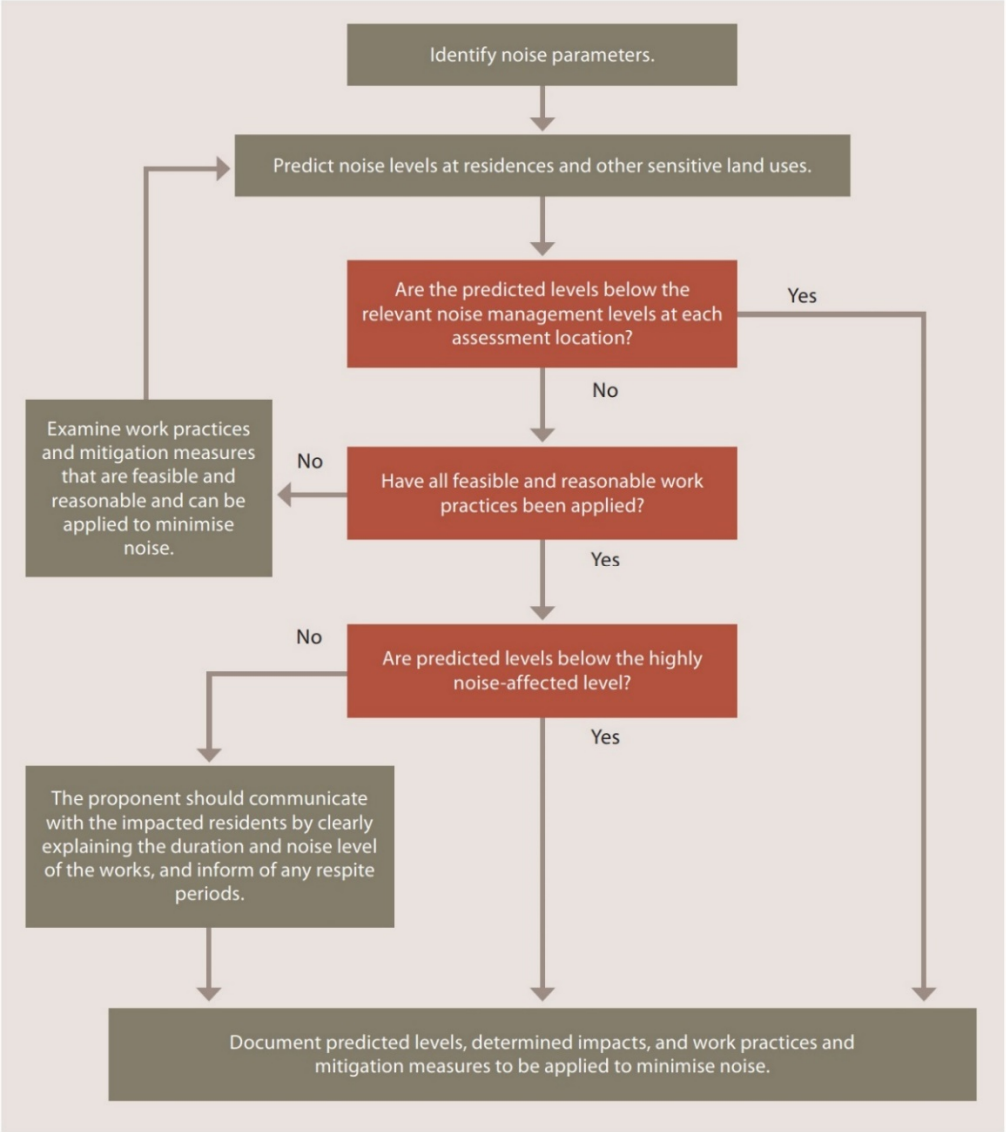
The ICNG sets out procedures to identify and address the impacts of construction noise on residences and other sensitive land uses. This section provides a summary of noise objectives that are applicable to the assessment. The ICNG provides two methodologies for the assessment of construction noise emissions:

- 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.

[2] https://www.liquorandgaming.nsw.gov.au/community-and-stakeholders/licensed-venues/sound-regulation-in-licensed-premises/frequently-asked-questions

Figure 2 Quantitative Assessment Processes for Assessing and Managing Construction Noise



Source: Department of Environment and Climate Change, 2009.

3.3.1 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.

3.3.2 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.

3.3.3 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 operation.

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 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.
Path Controls	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.
	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 situating plant.

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** (L1) 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 Thursday 30 May 2024 to Tuesday 11 July 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 ±0.5dBA.

Observations on-site identified the surrounding locality was typical of an urban environment, with road and rail traffic, commercial noise and wildlife noise audible.

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 urban amenity category. This criteria is used in conjunction with the intrusiveness criteria to determine the limiting criteria. The summary results of long-term unattended noise monitoring are provided in **Table 7**. The measured daily ABLs for the background monitoring are provided in **Table C24** in **Appendix C** along with the daily noise monitoring charts.

Table 7 Background Noise Monitoring Summary

Location	Measured background noise level, RBL, dBA			Measured LA_{eq}, dBA		
	Day 7am to 6pm	Evening 6pm to 10pm	Night 10pm to 7am	Day 7am to 6pm	Evening 6pm to 10pm	Night 10pm to 7am
L1	45	40	33	62	46	49

Note: Excludes periods of wind or rain affected data. Meteorological data obtained from the Bureau of Meteorology weather station Terrey Hills AWS 33.69 S 151.22E 199m AMSL.

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 ±0.5dBA. 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 Thursday 30 May 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

Location	Time (hrs)[1]	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
A1	11:58	83	66	45	WD: N WS: 2.5m/s Rain: Nil	Birds 50-83 Aircraft 45-52 Excavator at Commercial Premises 54-63 Traffic 40-50

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 Assessment Criteria

5.1 Operational 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 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 dB LA_{90}	PINL dB $LA_{eq(15min)}$
L1	Residential	Day	45	50
		Evening	40	45
		Night	33	38

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	1	8

Observations at locations in the surrounding locality support the assessment of the receiver as an urban 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 dB $LA_{eq(period)}$	ANL dB $LA_{eq(period)}$[2]	PANL dB $LA_{eq(15min)}$[3]
Residential	Urban	Day	60	55	58
		Evening	50	45	48
		Night	45	40	43
Commercial	All	When in use	65	60	63
Industrial	All	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 other 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 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 dB $LA_{eq(15min)}$	PANL dB $LA_{eq(15min)}$	PNTL dB $LA_{eq(15min)}$
Residential	Urban	Day	50	58	50
		Evening	45	48	45
		Night	38	43	38
Commercial	All	When in Use	N/A	63	63
Industrial	All	When in Use	N/A	68	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.

5.1.5 Maximum Noise Trigger Levels

The maximum noise trigger levels shown in **Table 13** are based on night time 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.

Table 13 Maximum Noise Trigger Levels (Night)

Residential Receivers			
$L_{Aeq(15min)}$		L_{Amax}	
40dB $L_{Aeq(15min)}$ or RBL + 5dB		52dB L_{Amax} or RBL + 15dB	
Trigger	40	Trigger	52
RBL +5dB	38	RBL +15dB	48
Highest	**38**	**Highest**	**52**

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

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

5.2 Construction Noise Management Levels

The Noise Management Levels (NMLs) for standard construction hours are presented in **Table 14**.

Table 14 Construction Noise Management Levels

Catchment (No) Receiver ID	Assessment Period[1]	Adopted RBL dB LA_{90}	NML dB $LA_{eq(15min)}$
Residential	Standard Hours	45	55 (RBL+10dBA)
Commercial Premises	When in use	N/A	70 (external)
Industrial Premises	When in use	N/A	75 (external)

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

5.3 Licensed Premises Disturbance Threshold

In lieu of the formal criteria outlined in the Vibrancy Reforms, to assess potential disturbance to community, a disturbance threshold for the licensed premises sources such as patrons, or amplified music performance will be undertaken. The adopted disturbance threshold has been reproduced in **Table 15** with the background level periods analysed for the period of 12pm to 12am.

Table 15 L&GNSW Disturbance Threshold

Location	Receiver Type	Period	Measured RBL dB LA_{90}	Disturbance Threshold dB $LA_{eq(15min)}$
L1	Residential	12pm to 12am	33	38

5.4 Cumulative Whole Premises Assessment

To further assess potential disturbance on a community, a cumulative whole premises assessment of licensed premises noise sources including patron, entertainment emissions along with operational noise sources including onsite vehicles and mechanical has been undertaken. The predicted levels are assessed against the measured existing ambient noise levels ($LA_{eq(15min)}$) in place of formalised criteria to provide an indication of the potential for disturbance. The measured existing ambient noise levels ($LA_{eq,15min}$) are presented in **Table 16**.

Table 16 Ambient Noise Monitoring Summary

Measured Ambient Noise Level dB $LA_{eq(period)}$		
Day	Evening	Night
62	46	49

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

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 CONCAWE[3]. 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.

[3] 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 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 operation buildings orientation;
- the Restaurant 1 mechanical air conditioning (AC) and refrigeration plant is located in the basement area of the building;
- the Restaurant 2 and Restaurant 3 mechanical AC and refrigeration plant are located on rooftop of the building above the loading bay coral area; and
- construction of an acoustic barrier around the rear of the stage area. The barrier is to be a minimum height of 3m above the ground level of stage and is to be constructed of materials with a minimum density of 10kg/m^2 and not contain any gaps;
- a total of 59 people are assumed to occupy the internal area of Restaurant 1;
- a total of 135 people are assumed to occupy the internal area of Restaurant 2;
- a total of 260 people are assumed to occupy the internal area of Restaurant 3;
- a total of 185 people are assumed to occupy the external Restaurant 1 dining area;
- a total of 55 people are assumed to occupy the external Restaurant 2 dining area;
- a total of 100 people are assumed to occupy the external Restaurant 3 dining area;
- external amplified music performance is undertaken on the outdoor stage only; and
- all glazing is a minimum of 6mm in thickness.

6.2 Sound Power Levels

An assessment of potential noise emissions associated with the project has been completed. The assessment has identified several noise sources that may contribute to potential acoustic impacts at surrounding residences and include mechanical plant, onsite customer vehicles, moderately amplified music and speech/conversation impacts from patrons. **Table 17** presents the sound power levels for each source assessed in the operational, maximum noise level and construction scenarios.

Table 17 Acoustically Significant Sources – Sound Power Levels (dBA*re 10^{-12} Watts)*

Item and number modelled per 15 minutes	Sound Power Level, dB L_{Aeq}	Modelled Source Sound Power Level, dB $L_{Aeq(15min)}$	Source Height[1]
NPI Operational Assessment			
Refrigeration Condenser (x4)	75	80	0.5m
External carpark vehicle start up and drive off (x35)[2]	81	87	0.5m
Rooftop Air Conditioning Units (x9)	81	91	1.6m
Roof Top Kitchen Exhaust Fan (x5)	75	82	0.5m
Rooftop Toilet Exhaust Fan (x5)	75	82	0.5m
Rooftop Extractor Fans (x5)	75	82	0.5m
Customers vehicles travelling through carpark (73 cars per 15-min)	81	91	0.5m
Delivery Truck (x1)	92	92	1.0m
Licensed Premises Assessment			
Patrons internally in Restaurant 1 (x59)	68	83	1.0m
Patrons internally in Restaurant 2 (x135)	68	86	1.0m
Patrons internally in Restaurant 3 (x260)	68	89	1.0m
Patrons in Restaurant 1 Outdoor Dining Area (x185)[3]	68	91	1.0m
Patrons in Restaurant 2 Outdoor Dining Area (x55)[3]	68	85	1.0m
Patrons in Restaurant 3 Outdoor Dining Area (x100)[3]	68	88	1.0m
Child in Playground (x40)	70	92	1.0m
Live Performance in Outdoor Courtyard (x1)	97	97	1.0m
NPI Maximum Noise Level Assessment (L_{Amax}), Night-time periods (10pm to 7am)			
Car Door Slam	87	87	0.5/1.0m
Delivery Impact	104	104	1.0m
ICNG Construction Noise Assessment			
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.

Note 3: Includes losses for breakout through open facades of the building.

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7 Noise Assessment Results

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

7.1 Operational Noise Assessment

Noise predictions from all sources excluding deliveries and waste collection have been quantified at surrounding residential receivers to the operation site and are presented in **Table 18**. Noise levels from are predicted to satisfy the relevant NPI noise criteria at all receivers during all assessment periods.

Table 18 Operational Noise Predictions Excluding Deliveries or Waste Collection

Residential Receivers

Rec	Predicted Noise Level dB $LA_{eq(15min)}$			PNTL dB $LA_{eq(15min)}$			Compliant
	Day	Evening	Night	Day	Evening	Night	
R01	37	37	37	50	45	38	✓
R02	35	35	35	50	45	38	✓
R03	38	38	38	50	45	38	✓
R04	38	38	38	50	45	38	✓

Other Receivers

Rec	Period	Predicted Noise Level dB $LA_{eq(15min)}$	PNTL dB $LA_{eq(15min)}$	Compliant
C01	When in use	38	63	✓
C02	When in use	38	63	✓
C03	When in use	35	63	✓
C04	When in use	51	63	✓
C05	When in use	43	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.

Heavy vehicle deliveries and waste collection are expected to be undertaken once per day, during the day, evening or night periods. Deliveries or waste collection usually take 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 and +2dB during the night period, when the event is expected to occur. **Table 19** presents results of the noise modelling for operations with heavy vehicle goods deliveries.

Table 19 Operational Noise Predictions Including Consumable Deliveries/Waste Collection

Residential Receivers

Rec	Predicted Noise Level dB $L_{Aeq(15min)}$			PNTL dB $L_{Aeq(15min)}$			Compliant
	Day	Evening	Night	Day	Evening	Night	
R01	37	37	37	57	52	40	✓
R02	35	35	35	57	52	40	✓
R03	38	38	38	57	52	40	✓
R04	38	38	38	57	52	40	✓

Other Receivers

Rec	Period	Predicted Noise Level dB $L_{Aeq(15min)}$	PNTL dB $L_{Aeq(15min)}$	Compliant
C01	When in use	38	70	✓
C02	When in use	38	70	✓
C03	When in use	35	70	✓
C04	When in use	51	70	✓
C05	When in use	43	70	✓
I01	When in use	<35	75	✓

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.

7.1.1 Maximum Noise Level Assessment

In assessing maximum noise events, typical L_{Amax} noise levels from transient events were assessed at the nearest residential receivers. For the sleep disturbance assessment, a sound power level of 87dBA for a door slam and 104dBA for delivery impact were adopted for maximum noise level (L_{Amax}) events during the night period. Predicted noise levels from L_{Amax} events for assessed receivers are presented in **Table 20.** Results identify that the maximum noise trigger levels will be satisfied for all assessed receivers.

Table 20 Maximum Noise Level Assessment (Night)[1]

Receiver	Predicted Noise Level dB LAmax				Maximum Trigger Levels dB LAmax	Compliant
	Door Slam Northeastern Space	Door Slam Northeastern Space	Delivery/ Waste Collection Impact	Outdoor Dining Courtyard Door Slam		
R01	<35	<35	<35	<35	52	✓
R02	<35	<35	38	<35	52	✓
R03	<35	<35	48	<35	52	✓
R04	<35	<35	42	<35	52	✓

Note 1: Monday to Saturday; Night 10pm to 7am. On Sundays and Public Holidays Night 10pm to 8am.

7.2 Licensed Premises Assessment

Table 21 presents the results of the assessment of the potential disturbance to community from licensed premises sources such as patrons and amplified music performance assessed against the disturbance threshold.

Table 21 Licensed Premises Levels – All Receivers

Rec	Period[1]	Predicted Noise Level dB $L_{Aeq(15min)}$	Disturbance Threshold dB $L_{Aeq(15min)}$	Compliant
R01	Day	37	38	✓
R02	Day	36	38	✓
R03	Day	38	38	✓
R04	Day	36	38	✓

Predictions identify that emissions from the licensed premises satisfy the disturbance threshold level at all assessed residential receivers. Notwithstanding, mitigation measures and management strategies outlined in **Section 8**, which are sourced from the DCG, are recommended to be adopted to further protect the quiet and good order of the neighbourhood.

7.3 Combined Premises Noise Assessment

Noise predictions from combined whole premises sources (operational and licensed premises noise sources) have been quantified at surrounding residential receivers to the project site and are presented in **Table 22**.

Table 22 Combined Premises Noise Predictions[1]

Receiver	Predicted Noise Level dB $LA_{eq,15min}$			Existing (Ambient) Noise Levels dB LA_{eq} (period)			Total Change dBA		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
R01	40	40	40	62	46	49	+0.0	+0.0	+0.0
R02	37	37	37	62	46	49	+0.0	+0.0	+0.0
R03	41	41	41	62	46	49	+0.0	+0.0	+0.0
R04	40	40	40	62	46	49	+0.0	+0.0	+0.0

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.

It is noted that received noise levels are predicted to be from 5dB to 25dB below existing ambient noise levels at the assessed residential receivers. The results demonstrate the residual sound will not result in an increase in existing ambient noise levels[4].

7.4 Construction Noise Assessment

Table 23 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 23 Construction Noise Levels – All Receivers

Rec	Period[1]	Predicted Noise Level dB $LA_{eq(15min)}$	Management Level dB $LA_{eq(15min)}$	Compliant
R01	Day	54	55	✓
R02	Day	54	55	✓
R03	Day	44	55	✓
R04	Day	49	55	✓
C01	Day	49	70	✓
C02	Day	53	70	✓
C03	Day	55	70	✓
C04	Day	57	70	✓
C05	Day	45	70	✓
I01	Day	60	75	✓

Note 1: See Table 4 of this report for Recommended Standard Hours for Construction.

[4] Residual sound is the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that is does not contribute to the ambient sound (BS4142 – Methodology for rating and assessing industrial and commercial sound).

8 Licensed Premises Noise Mitigation and Management Measures

The results of the licensed premises assessment identify that levels are below the adopted disturbance threshold level 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 possible.

8.1 Practical Tips to Manage Noise Emissions[5]

- 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;
- Initiate community meetings to discuss any disturbance issues and build good relationships with your local community;

[5] Source: Sound Management Guidance for licensed venue operators, NSW Government, 2024.

- 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.

8.2 Acoustic Guidance and Mitigation Strategies[6]

- 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;
- Install and utilise a noise limiter; and
- Prepare and adopt a noise management plan.

[6] Source: Sound Management Guidance for licensed venue operators, NSW Government, 2024.

9 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Assessment (NA) to quantify emissions from the proposed restaurant development to be located at 40 Myoora Road, Terrey Hills, NSW.

The assessment has quantified potential operation emissions pertaining to operational sources, such as customer generated noise, including light vehicles and mechanical plant operations for the project.

The results of the NA demonstrate that noise emissions from the operation 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 operation buildings orientation;
- the Restaurant 1 mechanical air conditioning (AC) and refrigeration plant is located in the basement area of the building;
- the Restaurant 2 and Restaurant 3 mechanical AC and refrigeration plant are located on rooftop of the building above the loading bay coral area; and
- construction of an acoustic barrier around the rear of the stage area. The barrier is to be a minimum height of 3m above the ground level of stage and is to be constructed of materials with a minimum density of 10kg/m^2 and not contain any gaps;
- a total of 90 people are assumed to occupy the internal area of Restaurant 1;
- a total of 150 people are assumed to occupy the internal area of Restaurant 2;
- a total of 275 people are assumed to occupy the internal area of Restaurant 3;
- a total of 200 people are assumed to occupy the external Restaurant 1 dining area;
- a total of 70 people are assumed to occupy the external Restaurant 2 dining area;
- a total of 120 people are assumed to occupy the external Restaurant 3 dining area;
- external amplified performance is undertaken on the outdoor stage only; and
- all glazing is a minimum of 6mm in thickness.

Furthermore, sleep disturbance is not anticipated, as emissions from maximum noise events (ie impact noise from door slams or deliveries) are predicted to satisfy the NPIs maximum noise trigger levels.

Modelled noise emissions from licensed premises sources such as amplified performances and patron noise, are below the adopted licensed premises threshold level and are not expected to unduly disturb the quiet and good order of neighbourhood.

Additionally, an assessment has quantified potential combined whole premises emissions pertaining to operational sources licensed premises sources from project site. It is noted that received noise levels are predicted to be from 5dB to 26dB below existing ambient noise levels at the assessed residential receivers. The results demonstrate the cumulative whole premises will not result in an increase in existing ambient noise levels

Modelled noise emissions from construction activities identify that predicted noise emissions will remain below the applicable construction management levels at all receivers taking into account the standard mitigation measures (see Table 6).

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

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

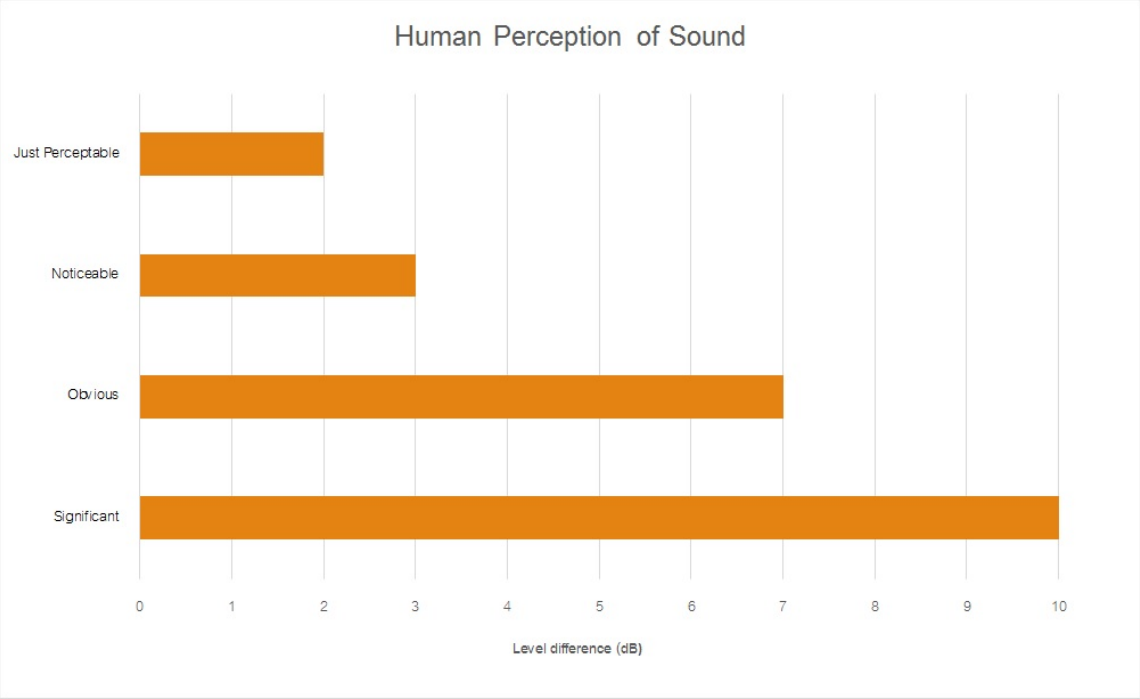
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for 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.
LAmax	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.log10 (W/Wo). 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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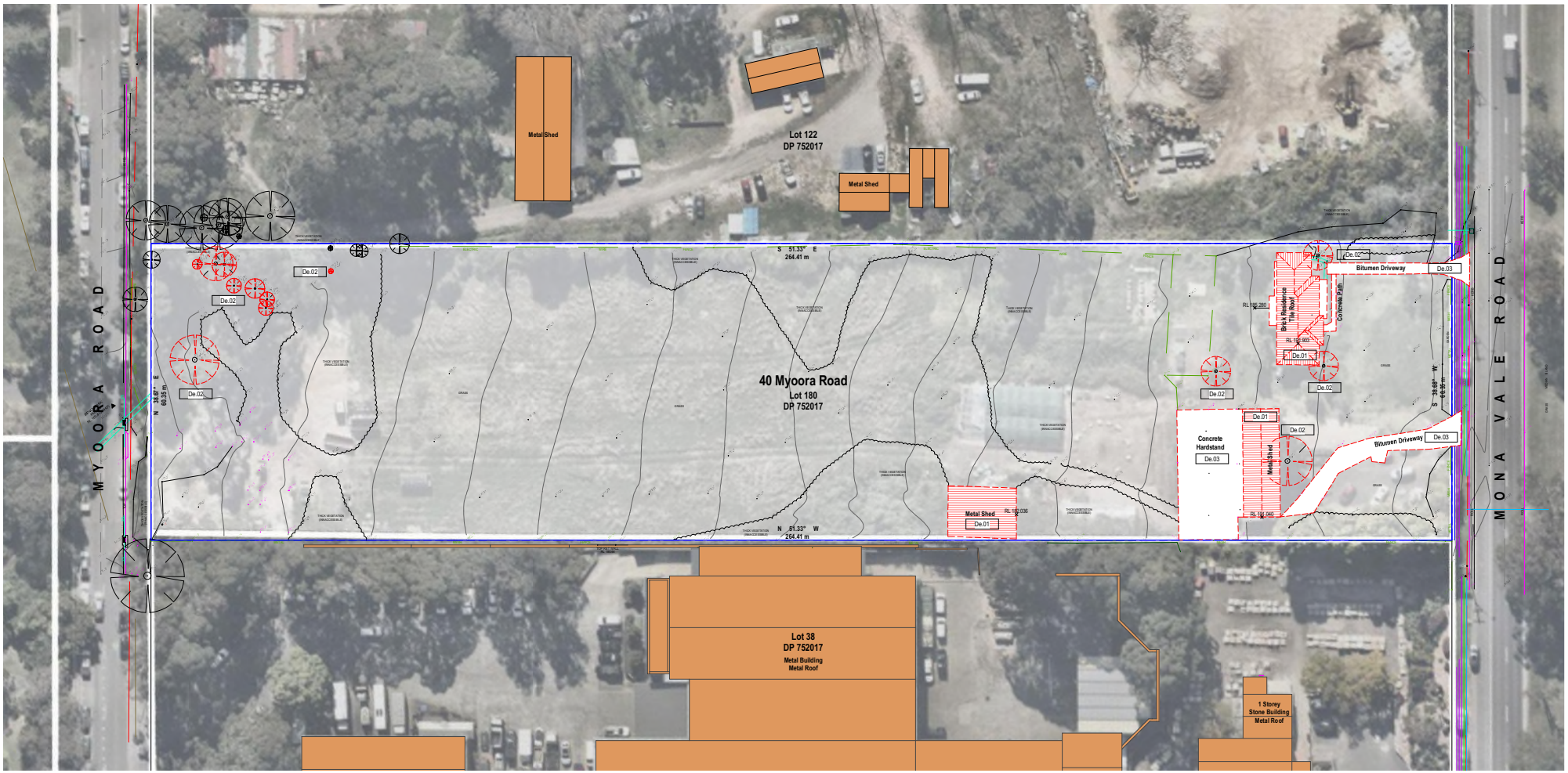
Appendix B – Site Plans



DA Legend

UNO the general extent and location of alterations or additions, including demolition is indicated accordingly:

- Proposed new building fabric
- Area of proposed demolition
- Neighbouring Light Industrial Buildings
- Neighbouring Residential Buildings
- Subject to final layout this area is to comply with Australian Standard 4674-2004; Design, construction and fit out of food premises. Refer to DA1-1200.

For Development Approval

General Notes

Rev	Date	Amendments
01	27.10.23	Issue for Information
02	31.10.23	Issue for Information
03	19.03.24	Consultant Issue
04	02.04.24	Issue for Information: Pre-DA Meeting
05	03.05.24	Issued for Landscape Coordination
06	21.05.24	Issue for Information: Design and Sustainability Advisory Panel
07	26.07.24	Issue for Information

Rev	Date	Amendments

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PO Box 490 Darlinghurst NSW 1300
Humphrey & Edwards Pty Ltd | ABN 89056638227
Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
Site Plan - Existing & Demolition

Scale @ A1	1:400	Drawn by	Checked by
Scale @ A3	1:800		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-0410	Rev	07

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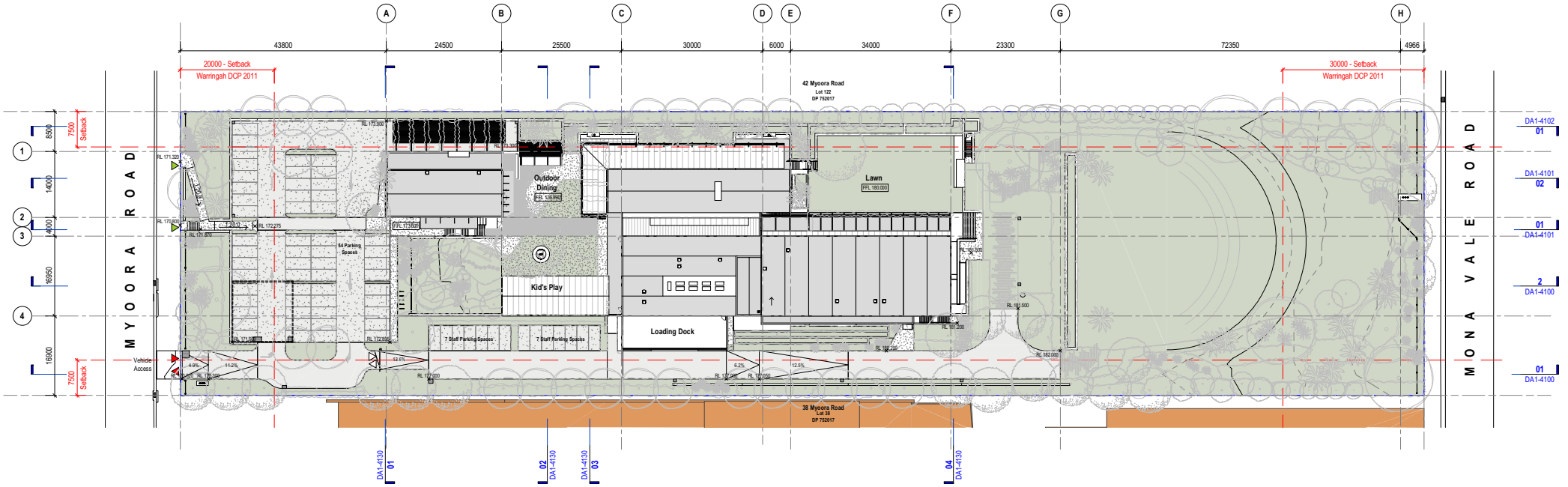

DA Legend

UNO the general extent and location of alterations or additions, including demolition is indicated accordingly:

- Proposed new building fabric
- Area of proposed demolition
- Neighbouring Light Industrial Buildings
- Neighbouring Residential Buildings
- Subject to final layout this area is to comply with Australian Standard 4674-2004; Design, construction and fit out of food premises. Refer to DA1-1200.

For Development Approval

General Notes

Rev	Date	Amendments
01	28.09.23	Preliminary Issue for Information
02	16.10.23	Issue for Information
03	27.10.23	Issue for Information
04	31.10.23	Issue for Information
05	19.03.24	Consultant Issue
06	02.04.24	Issue for Information: Pre-DA Meeting
07	03.05.24	Issued for Landscape Coordination
08	21.05.24	Issue for Information: Design and Sustainability Advisory Panel

Rev	Date	Amendments
09	26.07.24	Issue for Information

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Humphrey & Edwards Pty Ltd | ABN 89056638227
Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
Site Plan - Proposed

Scale @ A1	1:400	Drawn by	Checked by
Scale @ A3	1:800		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-0500	Rev	09

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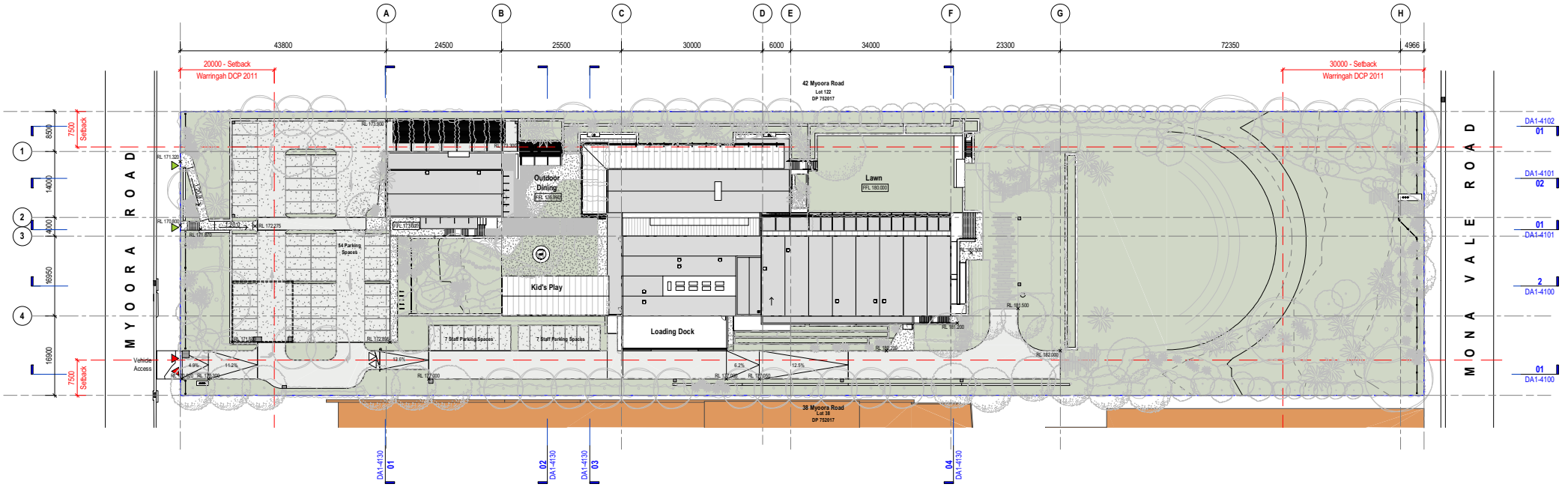

DA Legend

UNO the general extent and location of alterations or additions, including demolition is indicated accordingly:

- Proposed new building fabric
- Area of proposed demolition
- Neighbouring Light Industrial Buildings
- Neighbouring Residential Buildings
- Subject to final layout this area is to comply with Australian Standard 4674-2004; Design, construction and fit out of food premises. Refer to DA1-1200.

For Development Approval

General Notes

Rev	Date	Amendments
01	28.09.23	Preliminary Issue for Information
02	16.10.23	Issue for Information
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07	03.05.24	Issued for Landscape Coordination
08	21.05.24	Issue for Information: Design and Sustainability Advisory Panel

Rev	Date	Amendments
09	26.07.24	Issue for Information

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Humphrey & Edwards Pty Ltd | ABN 89056638227
Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
Site Plan - Proposed

Scale @ A1	1:400	Drawn by	Checked by
Scale @ A3	1:800		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-0500	Rev	09

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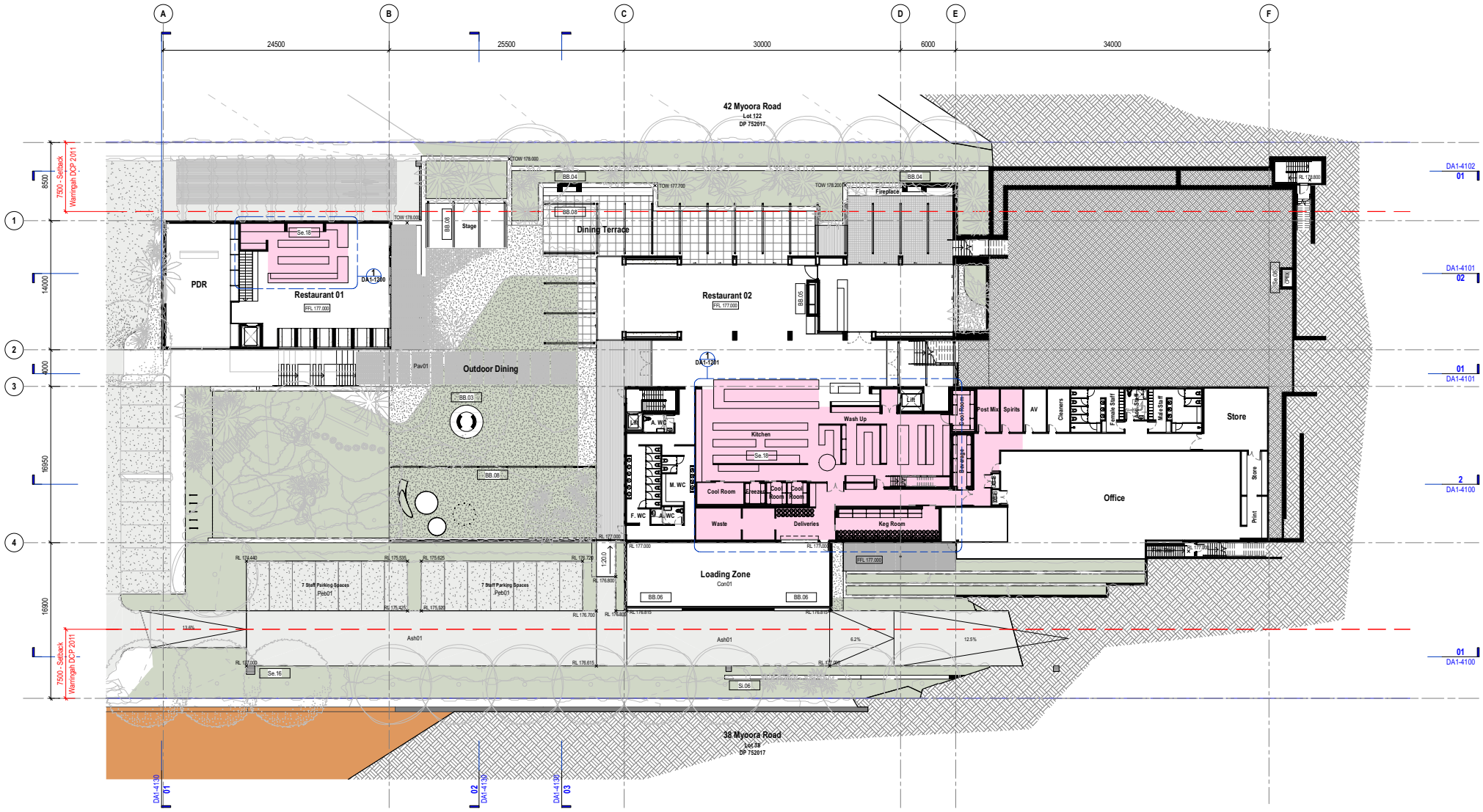

DA Legend

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- Proposed new building fabric
- Area of proposed demolition
- Neighbouring Light Industrial Buildings
- Neighbouring Residential Buildings
- Subject to final layout this area is to comply with Australian Standard 4674-2004; Design, construction and fit out of food premises. Refer to DA1-1200.

For Development Approval

General Notes

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Rev	Date	Amendments
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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
General Arrangement Plan - Restaurant 01 & 02

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-1013	Rev	09

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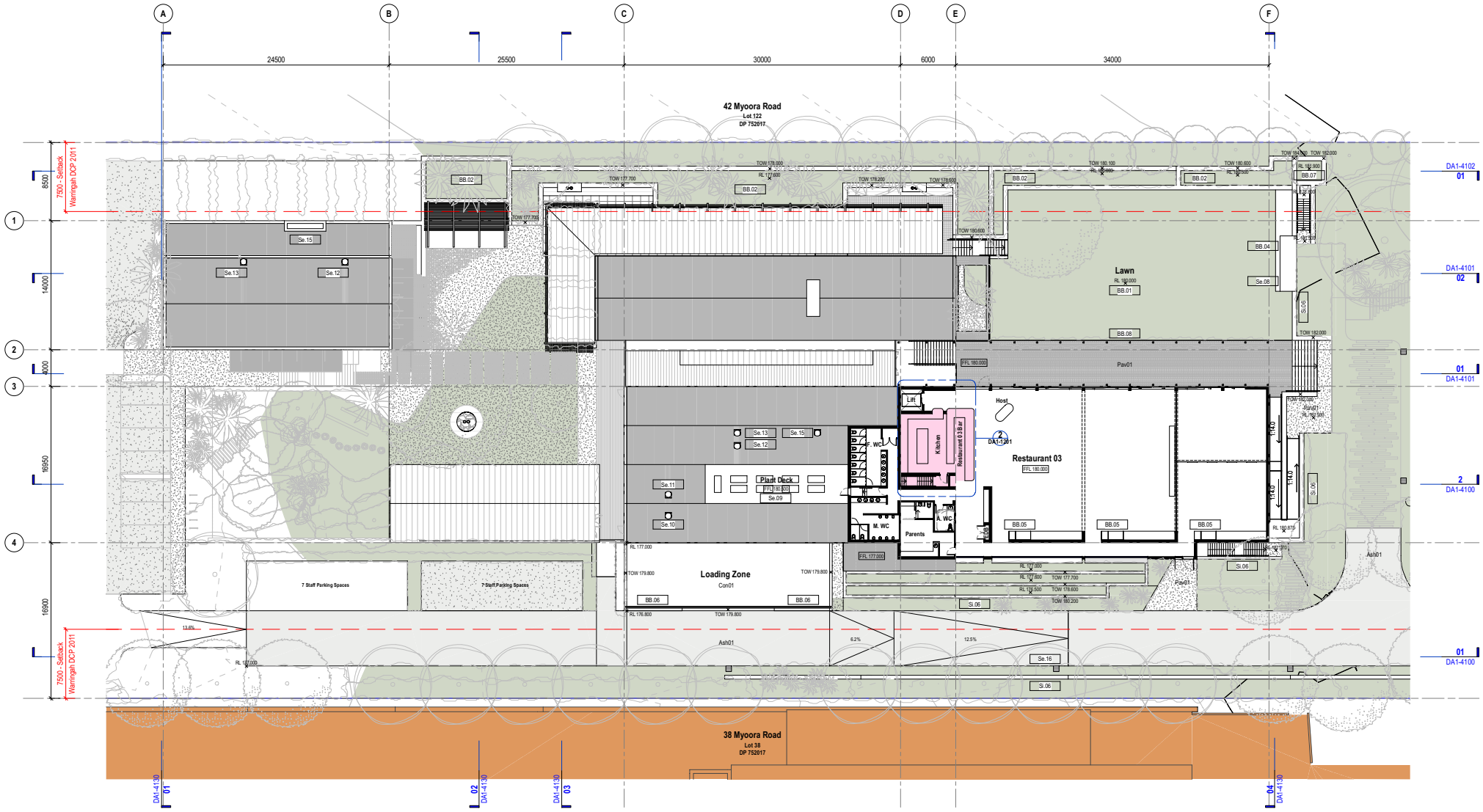

DA Legend

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For Development Approval

General Notes

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Rev	Date	Amendments
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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
General Arrangement Plan - Restaurant 03

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-1022	Rev	10

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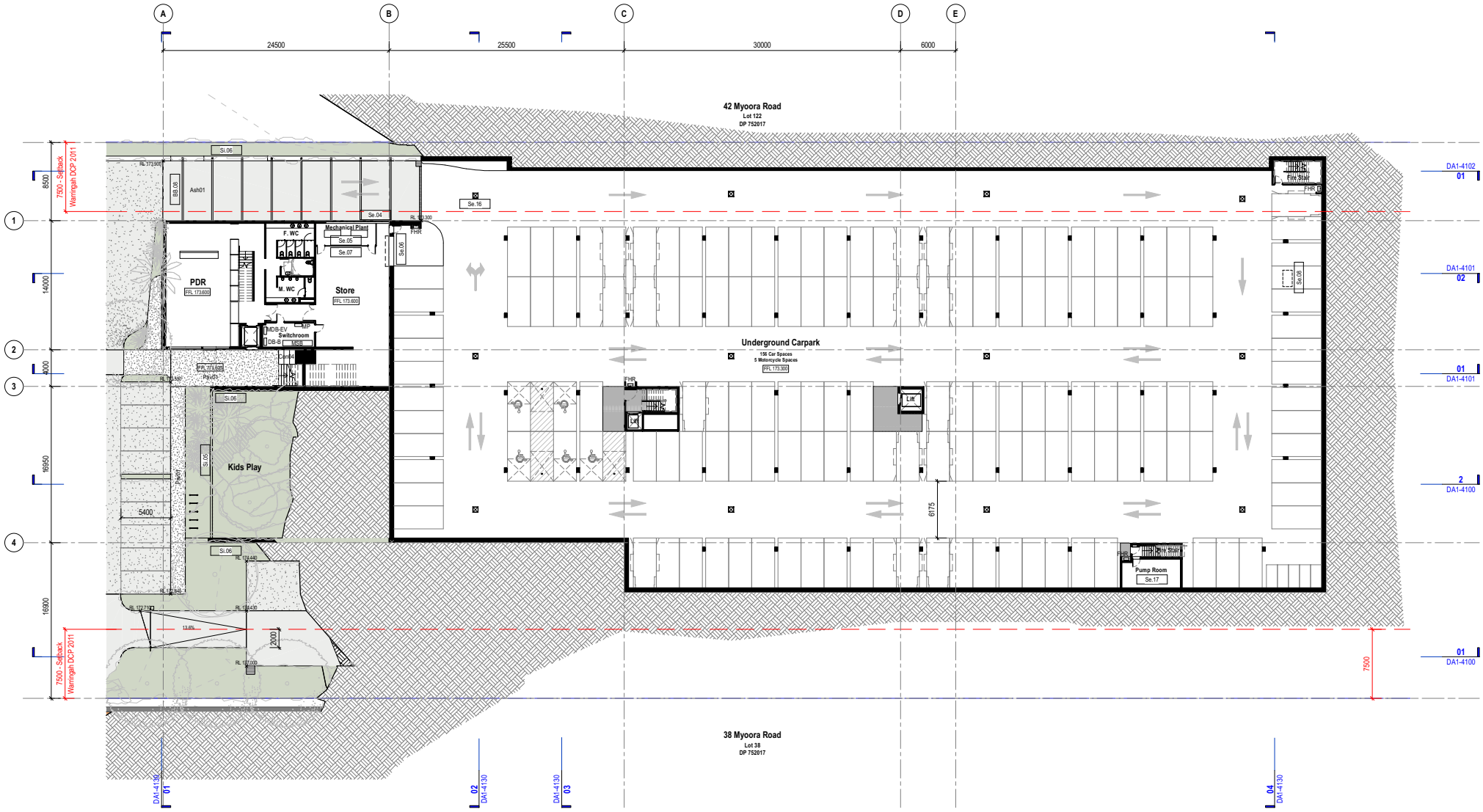

DA Legend

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For Development Approval

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Rev	Date	Amendments
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10	26.07.24	Issue for Information

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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
General Arrangement Plan - Basement & Restaurant 01

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
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Project #	2725		
Drawing #	DA1-1011	Rev	10

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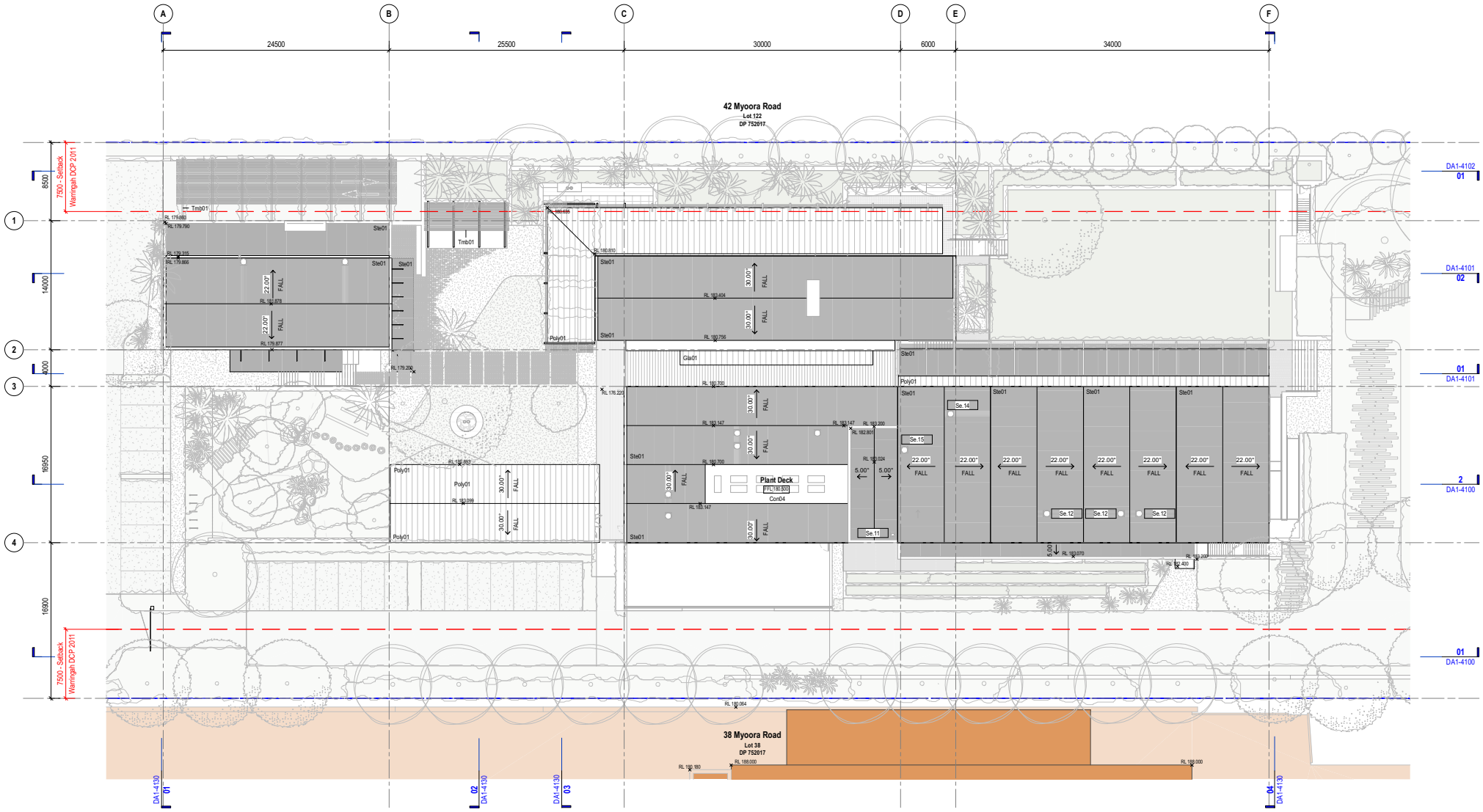

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- Neighbouring Residential Buildings
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For Development Approval

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Rev	Date	Amendments
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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
General Arrangement Plan - Roof

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
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Project #	2725		
Drawing #	DA1-1023	Rev	09

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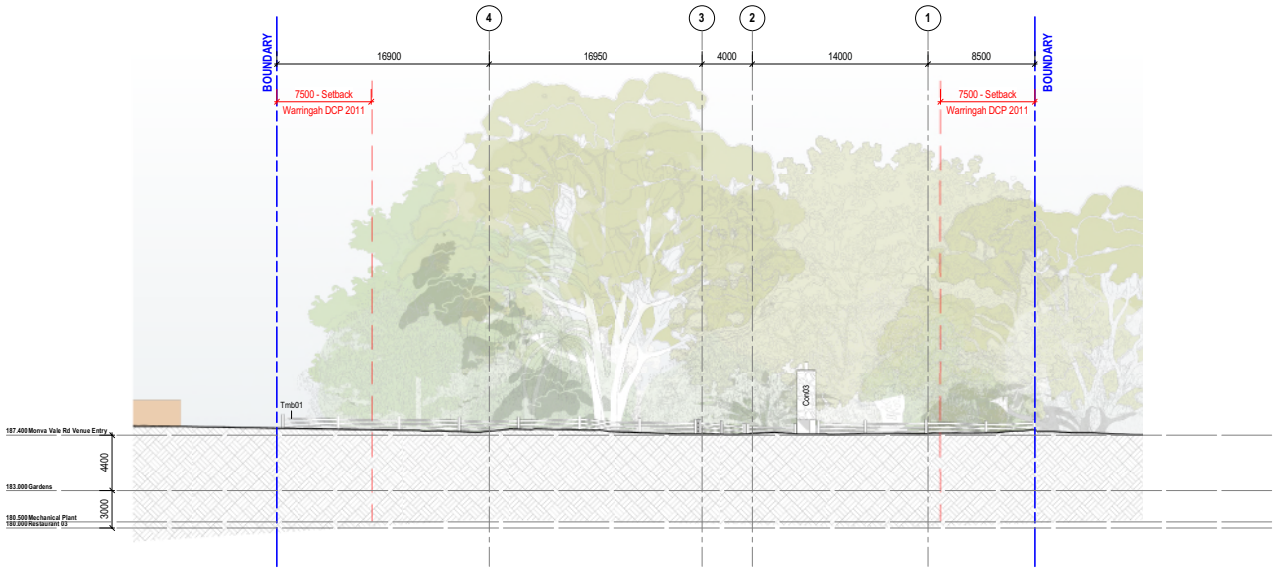
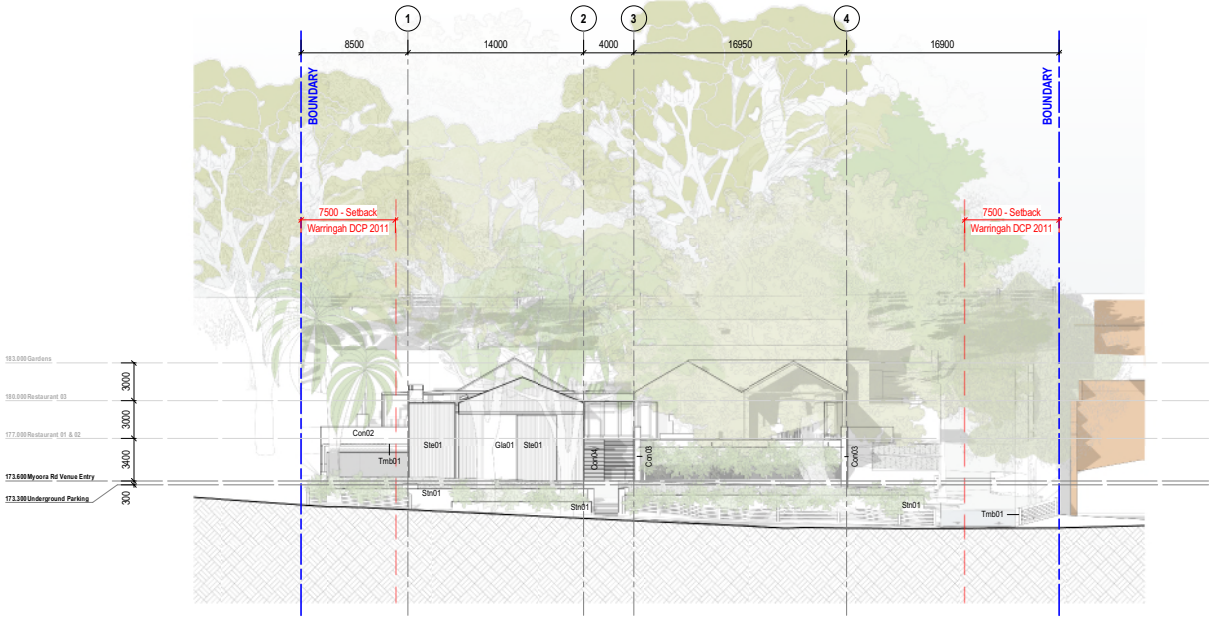


01 Site Elevation - Mona Vale Rd



02 Site Elevation - Myoora Rd

DA Legend

UNO the general extent and location of alterations or additions, including demolition is indicated accordingly:

- Proposed new building fabric
- Area of proposed demolition
- Neighbouring Commercial Buildings
- Neighbouring Residential Buildings
- Area of Existing Easement
- Refer to sheet as referenced for details

For Development Approval

General Notes

Rev	Date	Amendments
01	27.10.23	Issue for Information
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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
Streetscape Elevations - Proposed

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-3100	Rev	07

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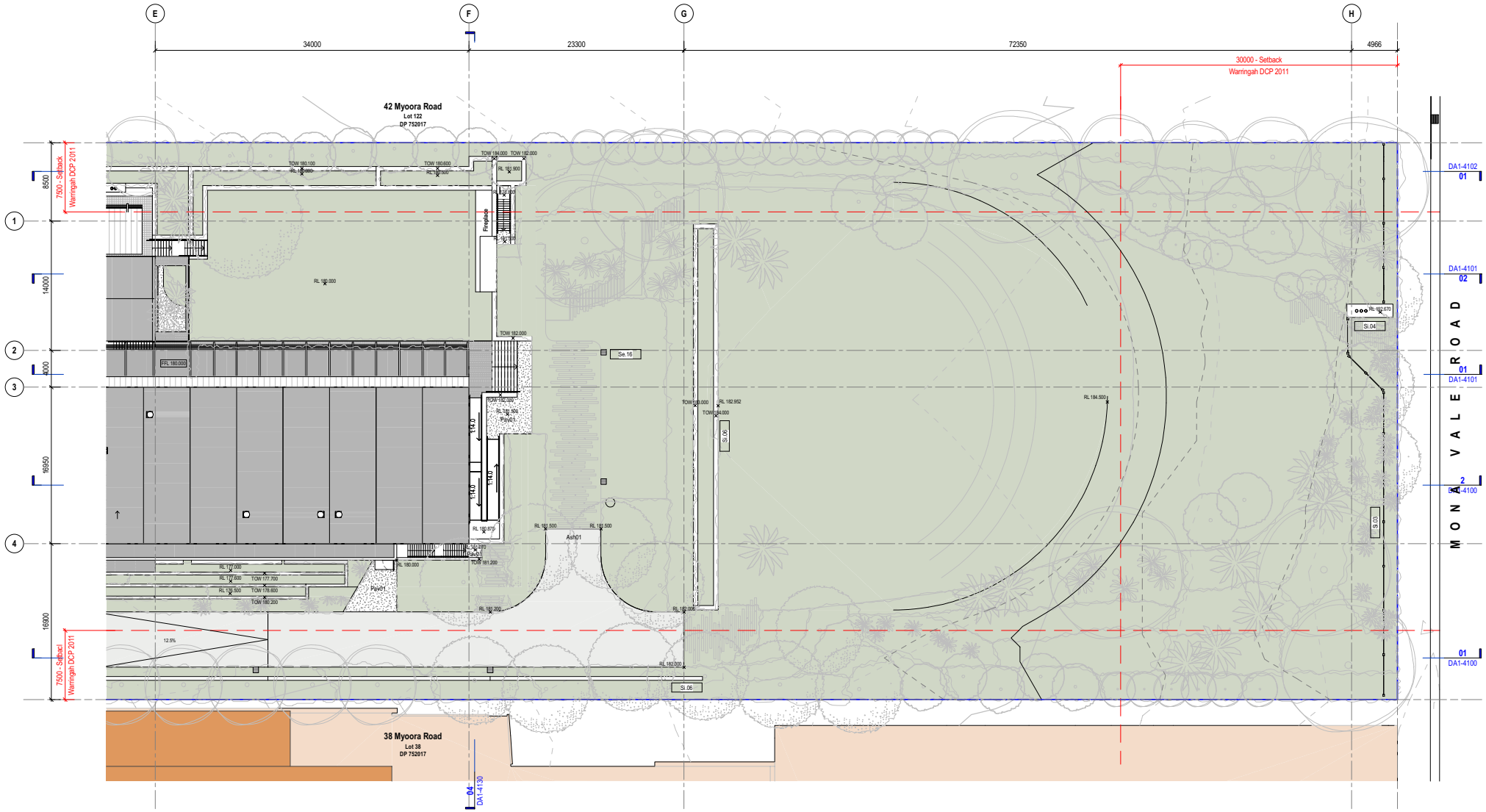

DA Legend

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For Development Approval

General Notes

Rev	Date	Amendments
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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
General Arrangement Plan - Gardens & Mona Vale Road

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-1024	Rev	01

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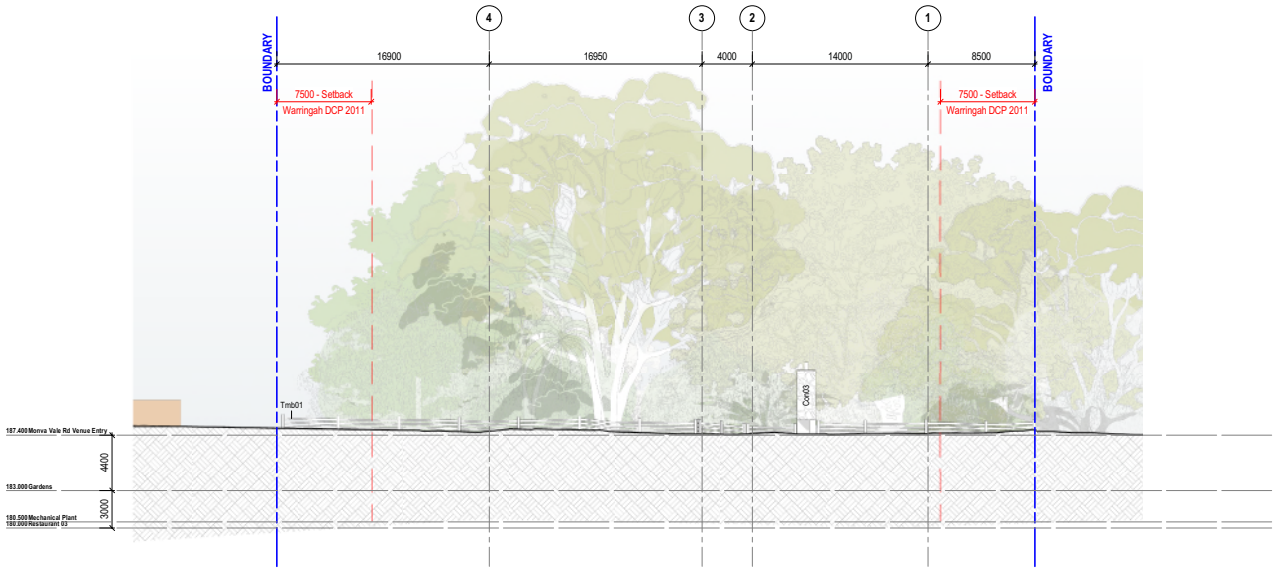
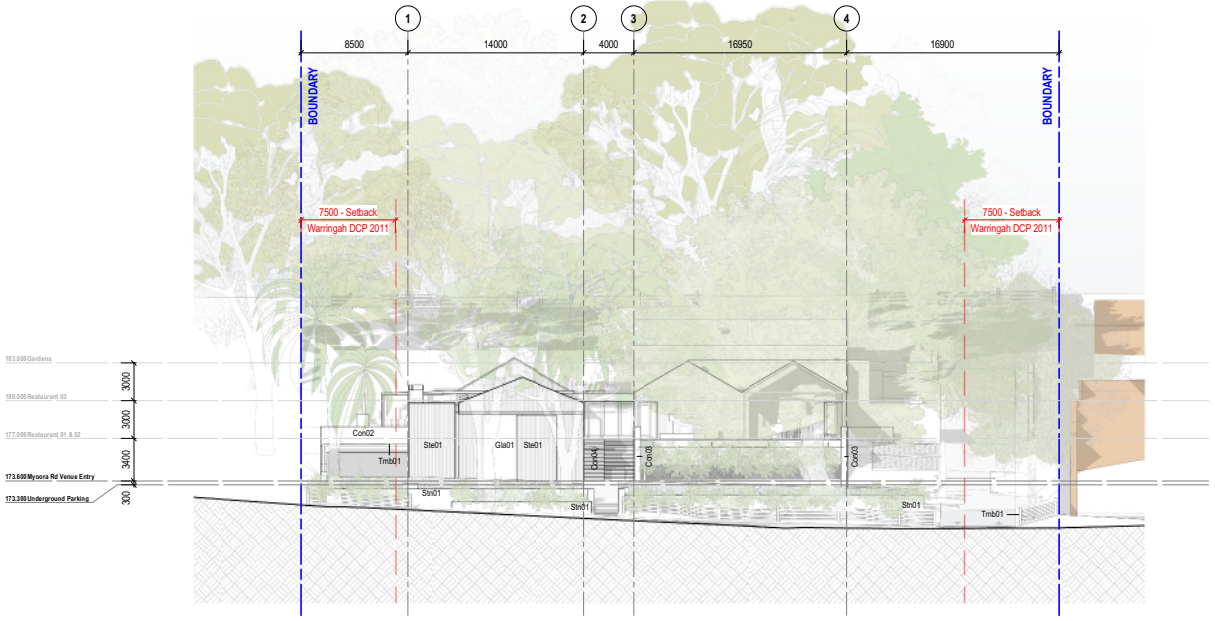


01 Site Elevation - Mona Vale Rd



02 Site Elevation - Myoora Rd

DA Legend

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- Neighbouring Residential Buildings
- Area of Existing Easement
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For Development Approval

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Rev	Date	Amendments

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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
Streetscape Elevations - Proposed

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-3100	Rev	07

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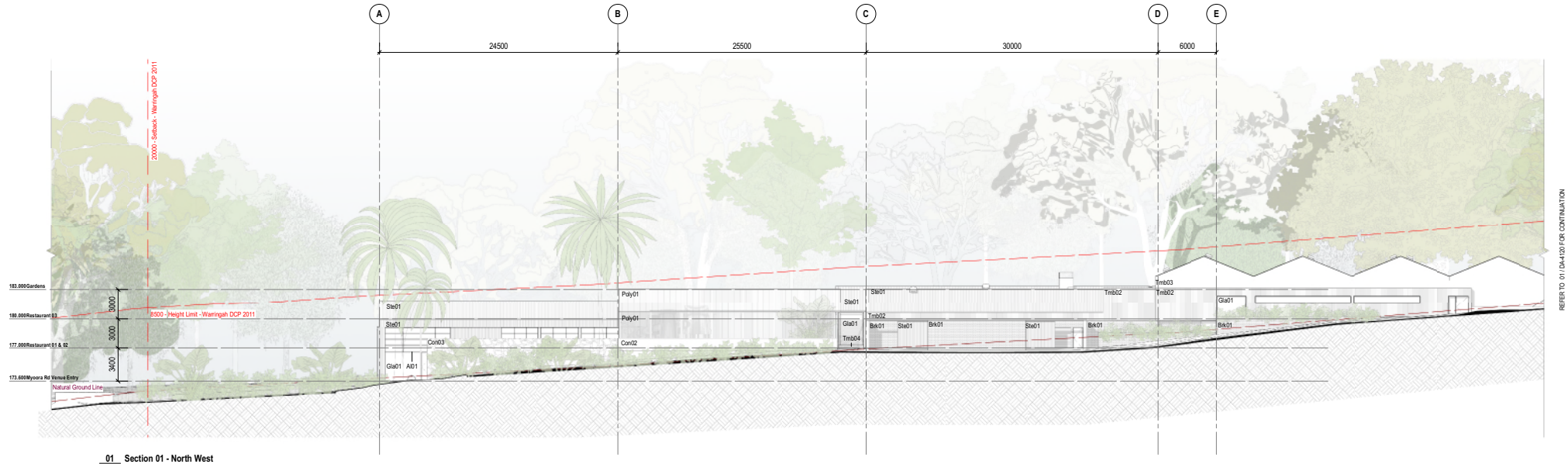
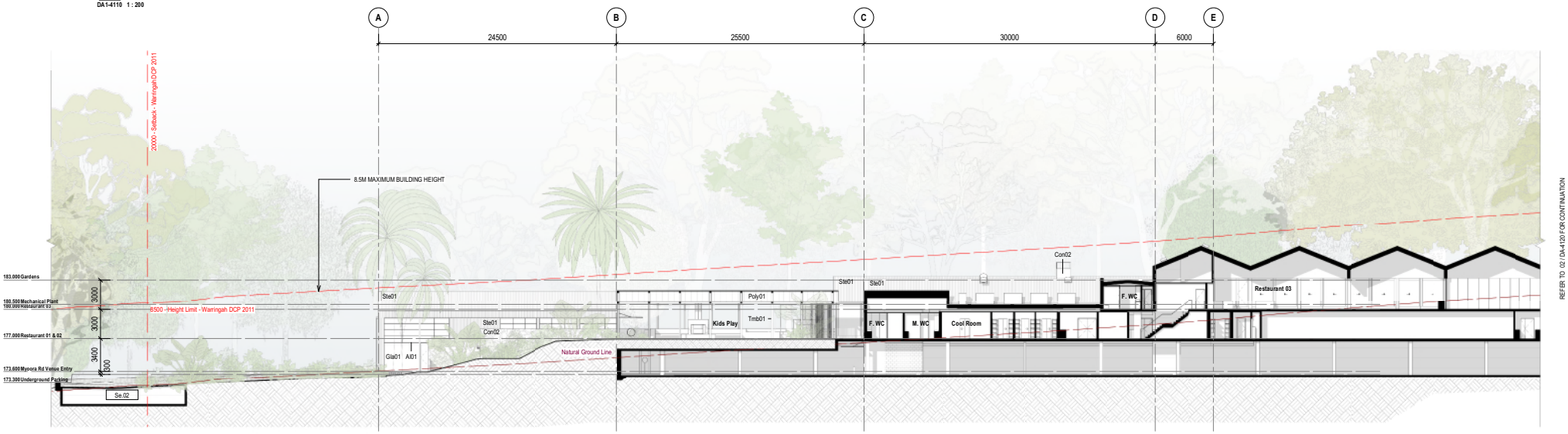


01 Section 01 - North West
DA1-4110 1 : 200



2 Section 01 - North West
DA1-4110 1 : 200

DA Legend

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Rev	Date	Amendments
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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
North West - Proposed Sections - Sheet 01

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
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Project #	2725		
Drawing #	DA1-4110	Rev	09

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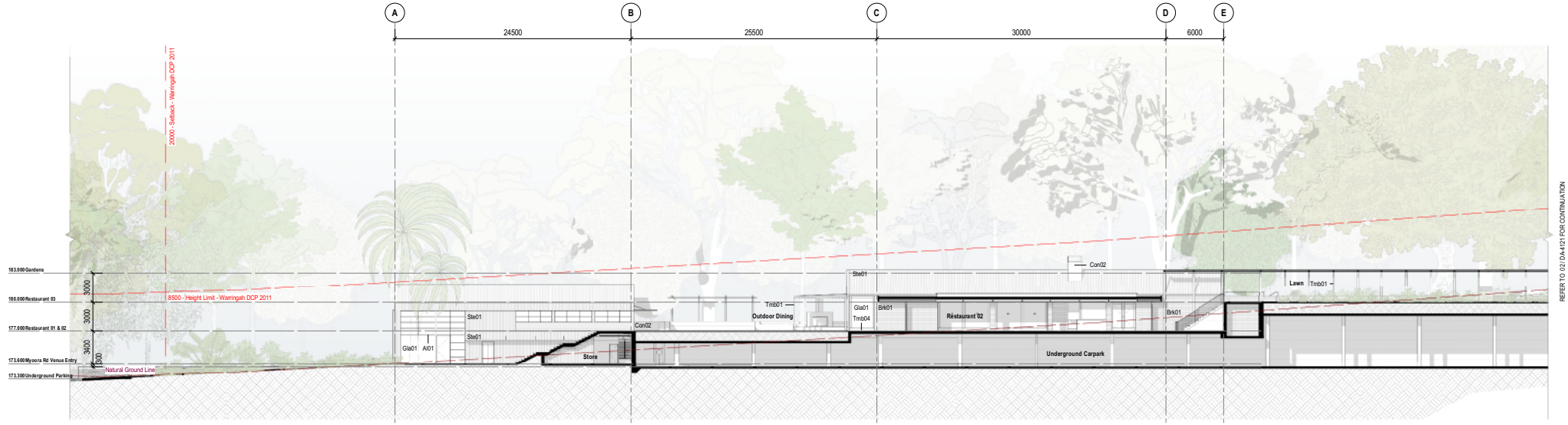
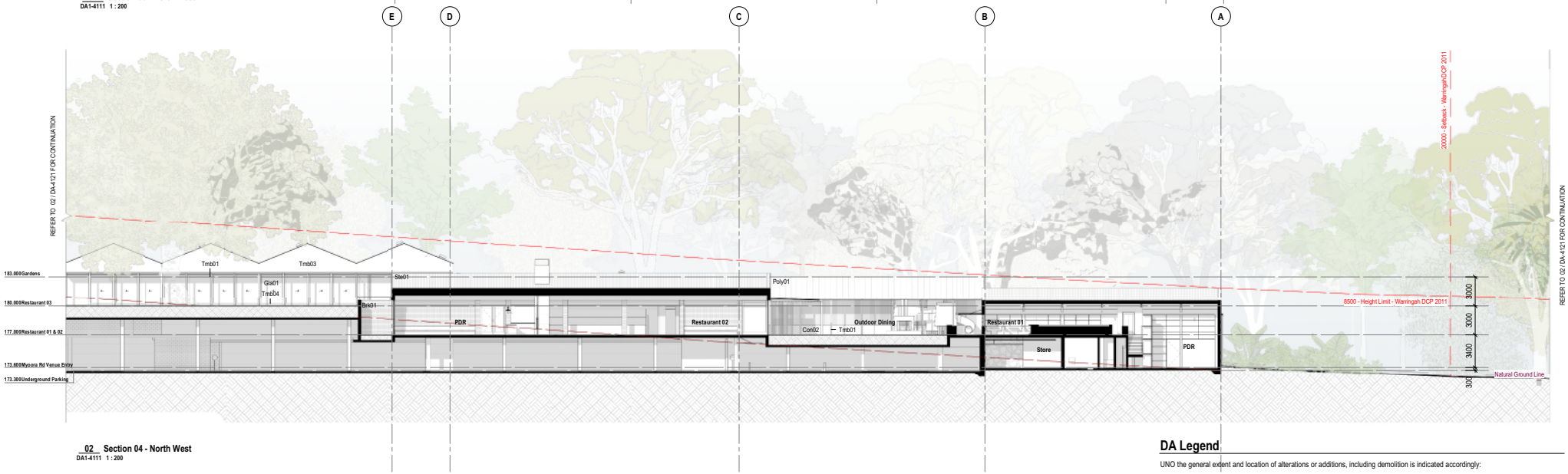


01 Section 03 - North West
DA1-4111 1 : 200



02 Section 04 - North West
DA1-4111 1 : 200

DA Legend

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For Development Approval

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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
North West - Proposed Sections - Sheet 02

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
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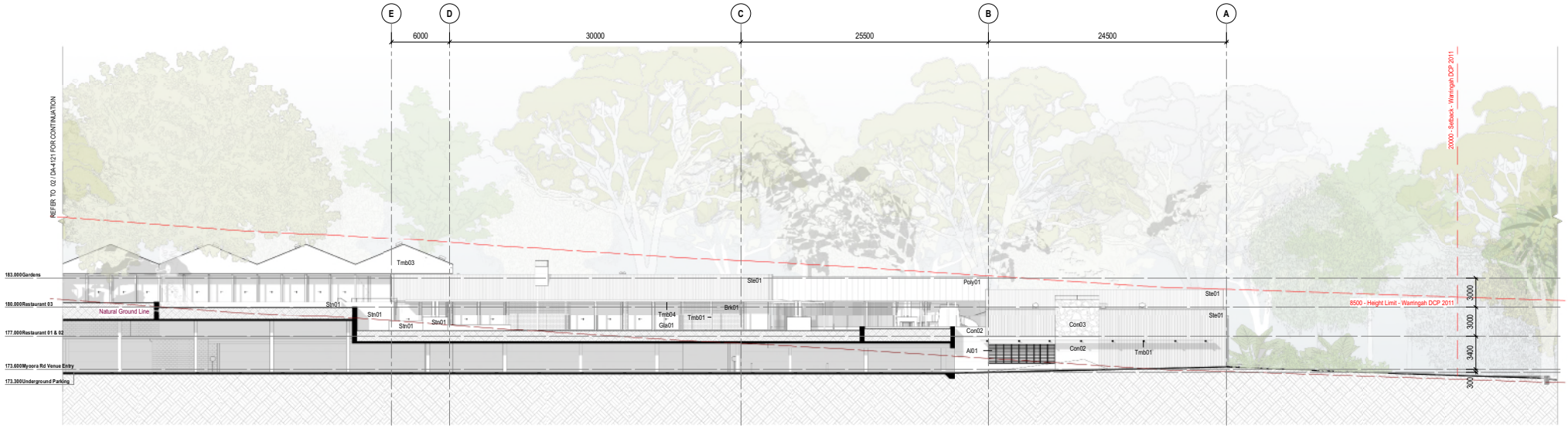
Project #	2725		
Drawing #	DA1-4111	Rev	09

26/07/2024 11:29:35 AM



01 Section 05 - North West
DA1-4112 1 : 200

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Rev	Date	Amendments
01	16.10.23	Issue for Information
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04	19.03.24	Consultant Issue
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Rev	Date	Amendments

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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

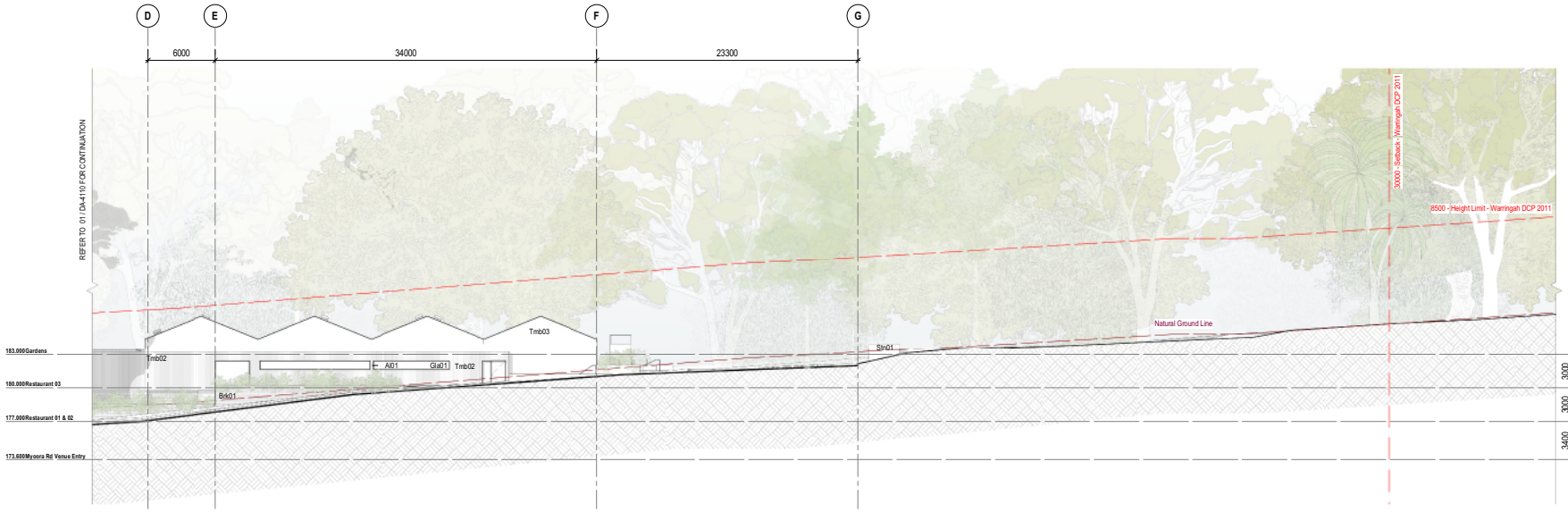
Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
North West - Proposed Sections - Sheet 03

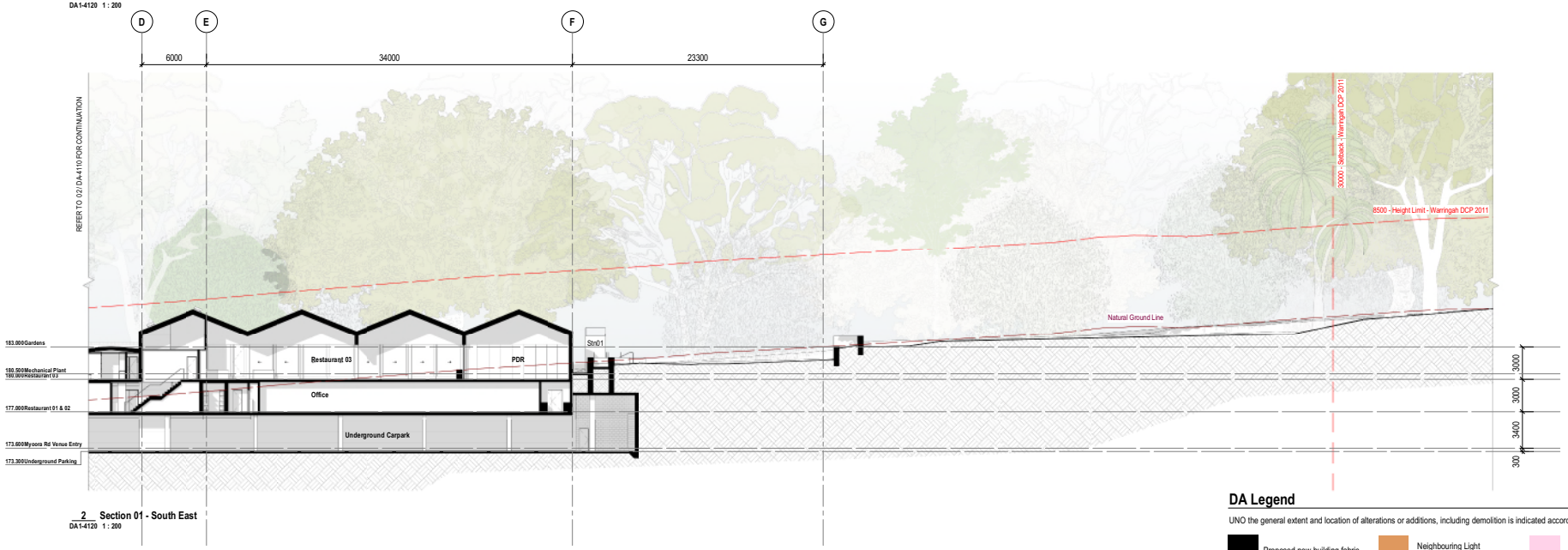
For Development Approval

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-4112	Rev	08

26/07/2024 11:30:46 AM



01 Section 01 - South East
DA1-4120 1 : 200



2 Section 01 - South East
DA1-4120 1 : 200

DA Legend

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Rev	Date	Amendments
09	26.07.24	Issue for Information

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Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
South East - Proposed Sections - Sheet 01

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-4120	Rev	09

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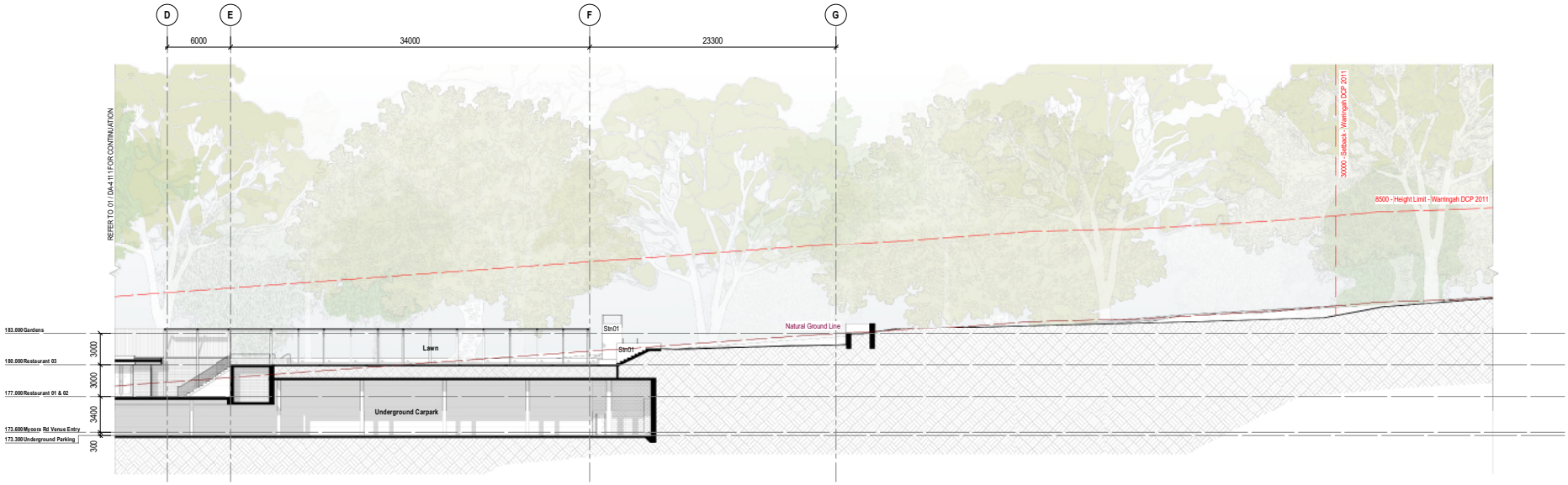
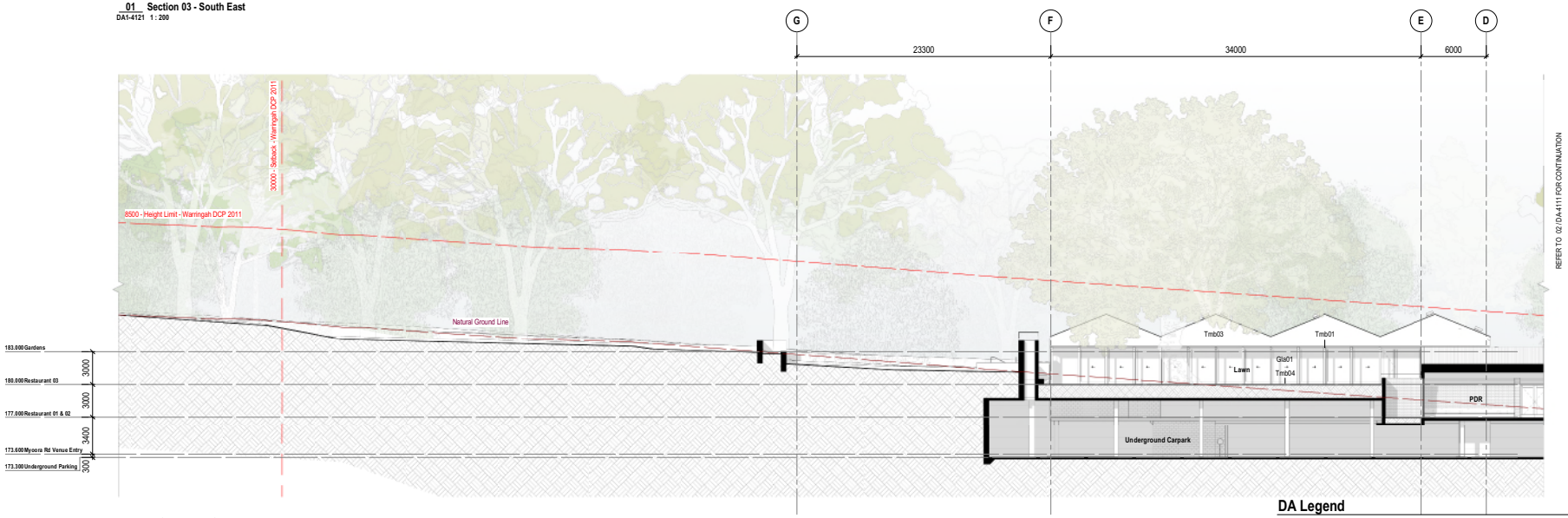


01 Section 03 - South East
DA1-4121 1 : 200



02 Section 04 - South East
DA1-4121 1 : 200

DA Legend

UNO the general extent and location of alterations or additions, including demolition is indicated accordingly:

- Proposed new building fabric
- Area of proposed demolition
- Neighbouring Light Industrial Buildings
- Neighbouring Residential Buildings
- Subject to final layout this area is to comply with Australian Standard 4674-2004; Design, construction and fit out of food premises. Refer to DA1-1200.

For Development Approval

General Notes

Rev	Date	Amendments
01	28.09.23	Preliminary Issue for Information
02	16.10.23	Issue for Information
03	27.10.23	Issue for Information
04	31.10.23	Issue for Information
05	19.03.24	Consultant Issue
06	02.04.24	Issue for Information: Pre-DA Meeting
07	03.05.24	Issued for Landscape Coordination
08	21.05.24	Issue for Information: Design and Sustainability Advisory Panel

Rev	Date	Amendments
09	26.07.24	Issue for Information

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Humphrey & Edwards Pty Ltd | ABN 89056638227
Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

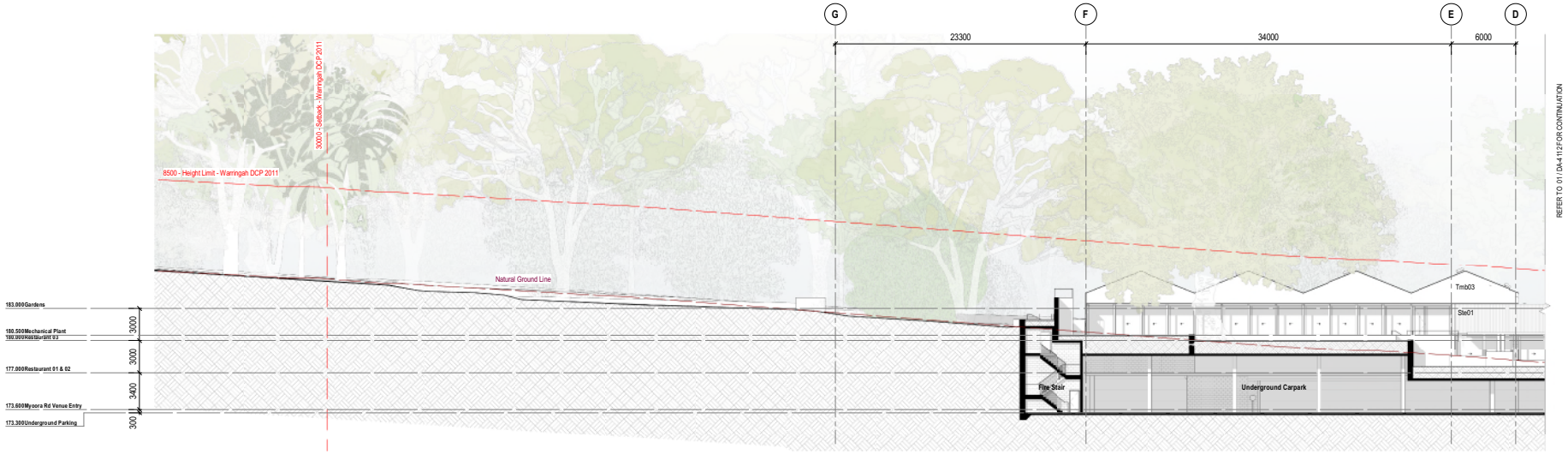
Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
South East - Proposed Sections - Sheet 02

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-4121	Rev	09

26/07/2024 11:33:37 AM



01 Section 05 - South East
DA1-4122 1 : 200

General Notes

Rev	Date	Amendments
01	16.10.23	Issue for Information
02	27.10.23	Issue for Information
03	31.10.23	Issue for Information
04	19.03.24	Consultant Issue
05	02.04.24	Issue for Information: Pre-DA Meeting
06	03.05.24	Issued for Landscape Coordination
07	21.05.24	Issue for Information: Design and Sustainability Advisory Panel
08	26.07.24	Issue for Information

Rev	Date	Amendments

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Humphrey & Edwards Pty Ltd | ABN 89056638227
Nominated Architect: Glenn Cunnington #6415

Project
40 Myoora Road

Client
Gardoxi P/L (Norwest)

Location
40 Myoora Road, Terrey Hills NSW 2084

Drawing
South East - Proposed Sections - Sheet 03

For Development Approval

Scale @ A1	1:200	Drawn by	Checked by
Scale @ A3	1:400		
Project Start Date	Issue Date	Sheet Issue Date	26/07/24
Project #	2725		
Drawing #	DA1-4122	Rev	08

26/07/2024 11:34:36 AM

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Appendix C – Noise Monitoring Charts

Table C24 Background Noise Monitoring Summary – Unattended Noise Monitoring (L1)

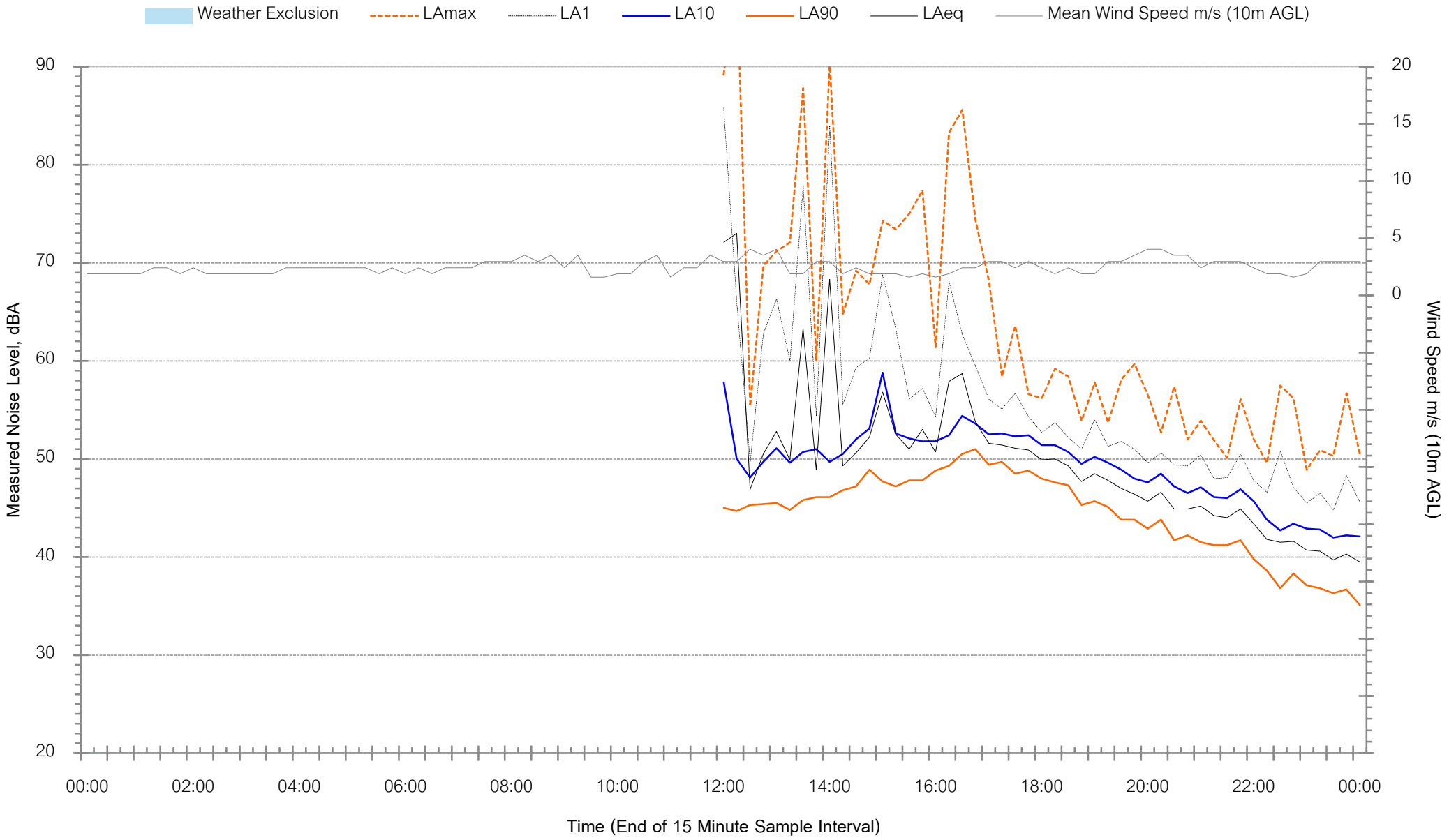
Date	Measured Background Noise Level (LA_{90}) dB ABL[1]			Measured dB $LA_{eq(period)}$		
	Day	Evening	Night	Day	Evening	Night
Thursday 30 May 2024	-[2]	41	33	-[2]	47	49
Friday 31 May 2024	46	40		59	44	-[2]
Saturday 1 June 2024	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]
Sunday 2 June 2024	45	36	33	62	45	46
Monday 3 June 2024	44	40	36	61	45	50
Tuesday 4 June 2024	44	40	32	65	47	45
Wednesday 5 June 2024	45	38	32	66	45	53
Thursday 6 June 2024	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]
Friday 7 June 2024	44	38	-[2]	60	44	-[2]
Saturday 8 June 2024	45	40	33	61	46	47
Sunday 9 June 2024	43	38	-[2]	58	46	-[2]
Monday 10 June 2024	45	40	32	57	46	50
Tuesday 11 June 2024	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]
RBL / Leq Overall	45	40	33	62	46	49

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 2: Measurement removed due to adverse weather as per NPI Fact Sheet A.

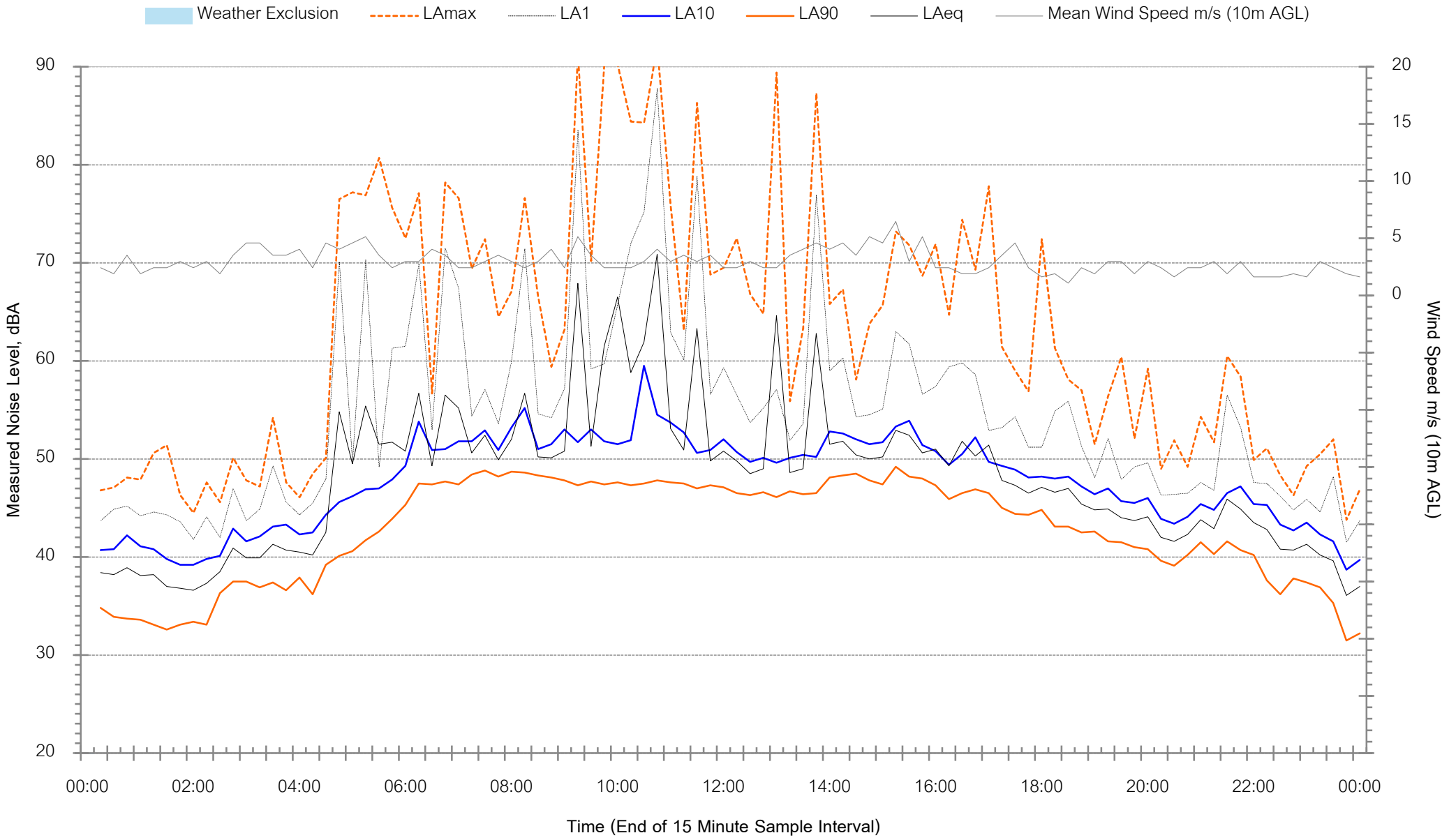
Background Noise Levels

IPD Terrey Hills, NSW - Thursday 30 May 2024



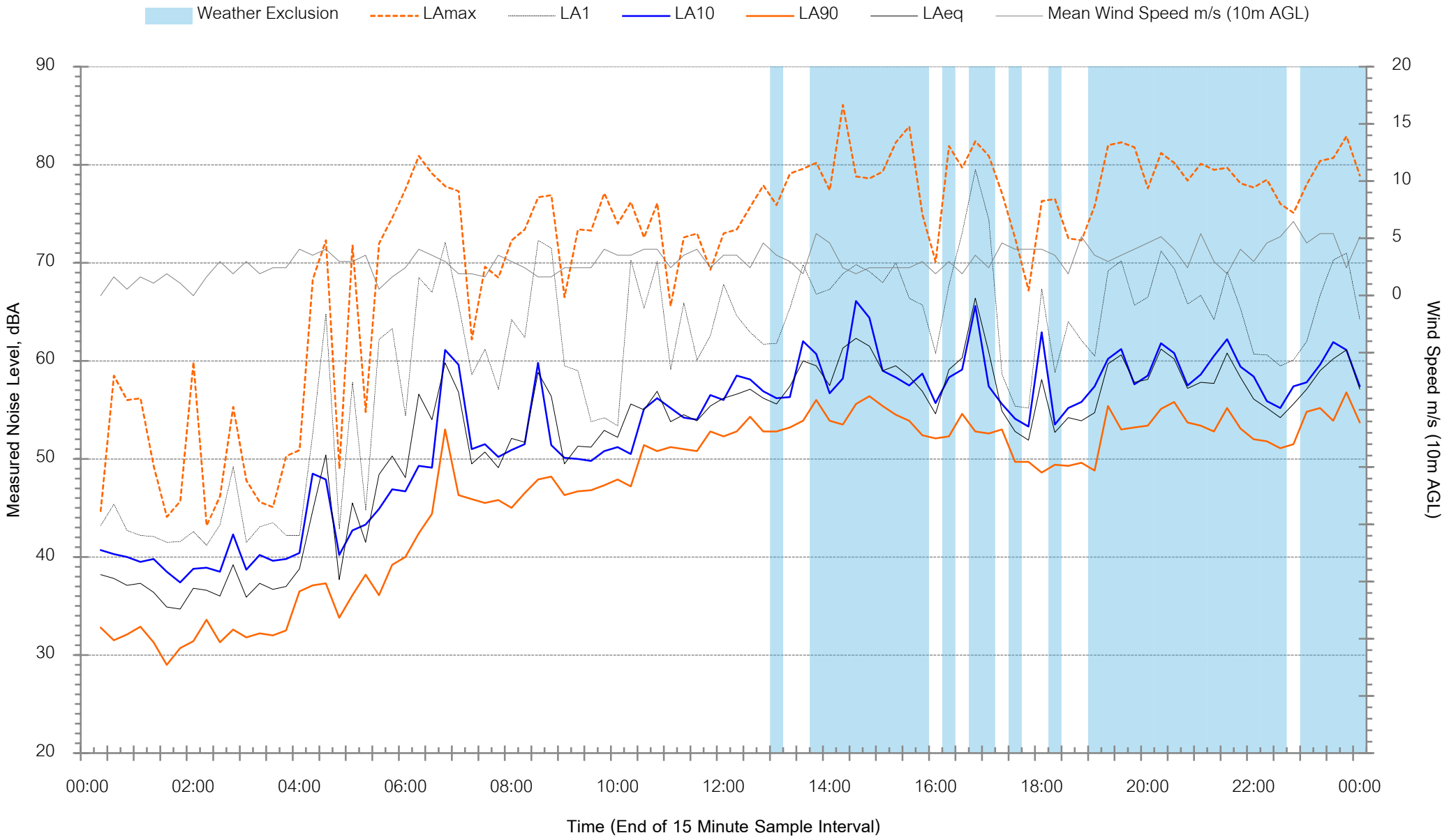
Background Noise Levels

IPD Terrey Hills, NSW - Friday 31 May 2024



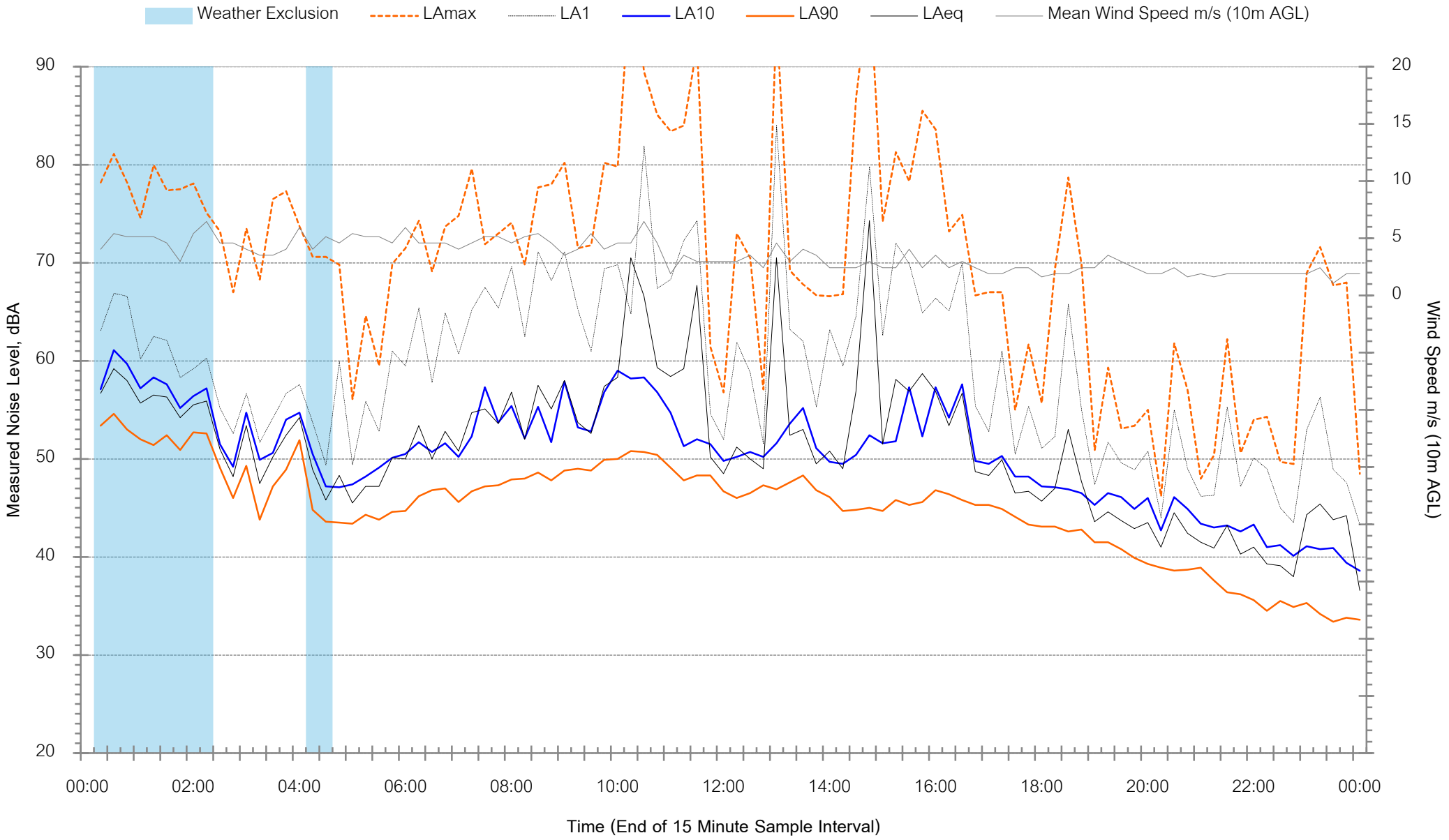
Background Noise Levels

IPD Terrey Hills, NSW - Saturday 1 June 2024



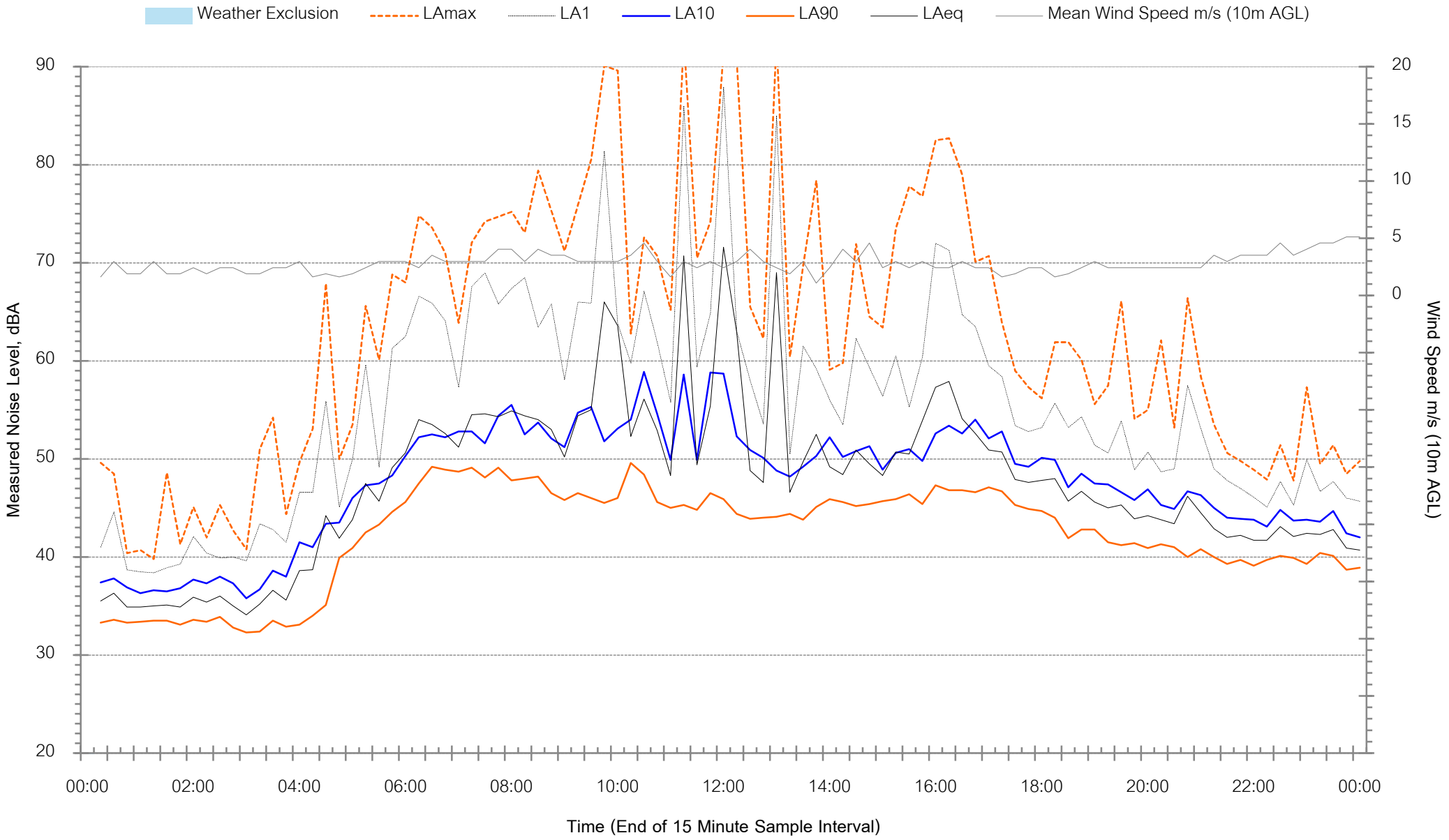
Background Noise Levels

IPD Terrey Hills, NSW - Sunday 2 June 2024



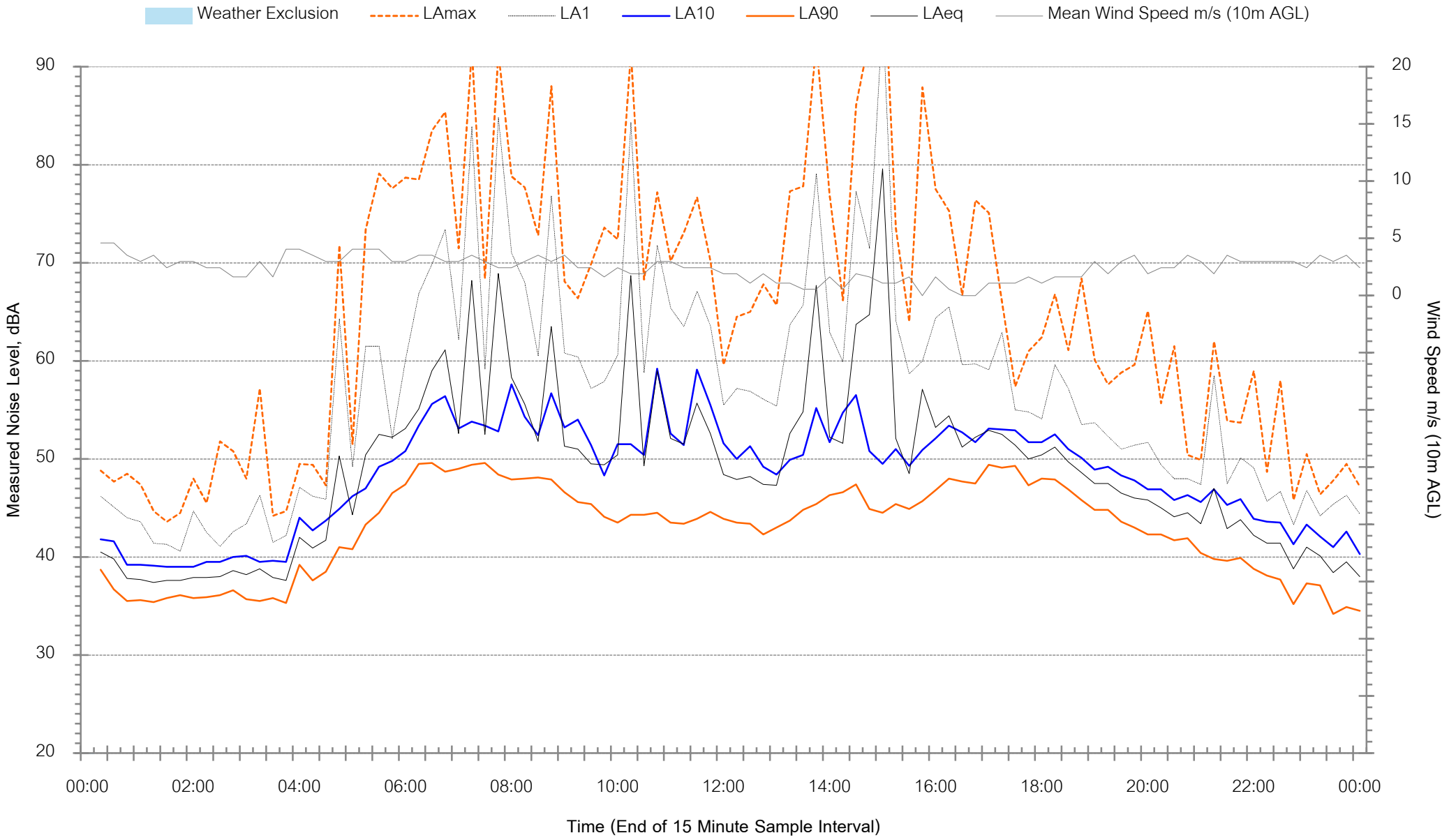
Background Noise Levels

IPD Terrey Hills, NSW - Monday 3 June 2024



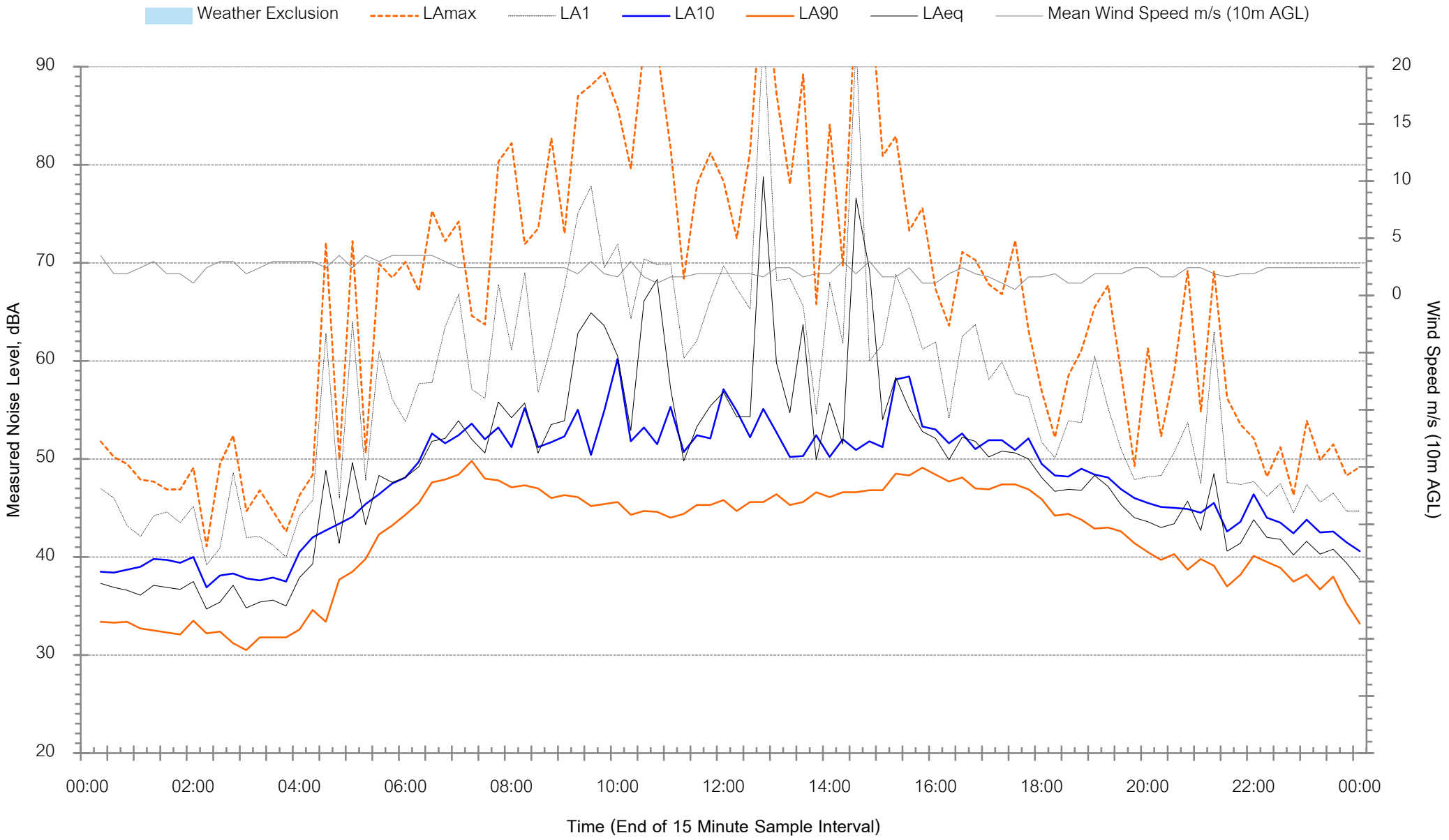
Background Noise Levels

IPD Terrey Hills, NSW - Tuesday 4 June 2024



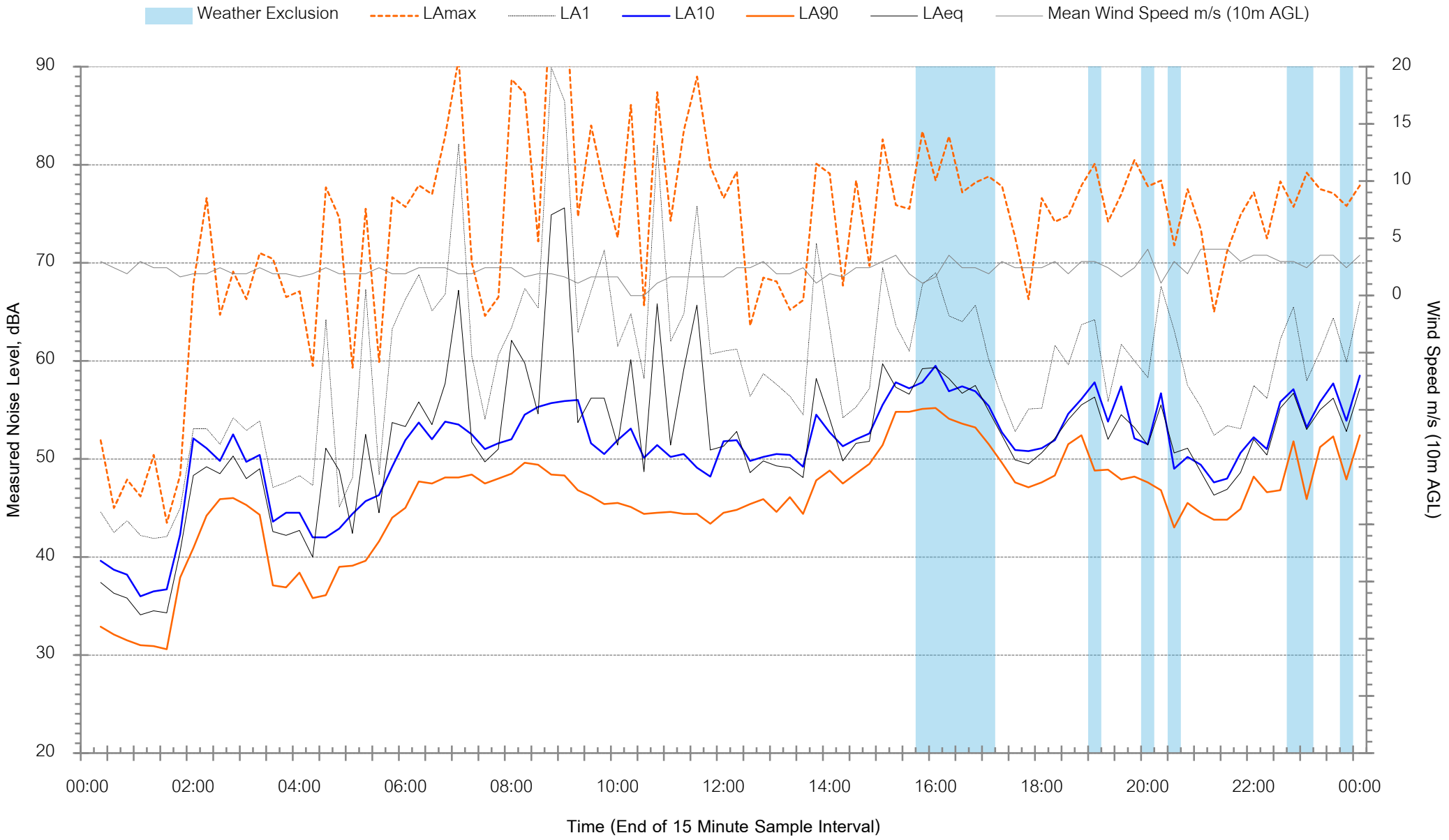
Background Noise Levels

IPD Terrey Hills, NSW - Wednesday 5 June 2024



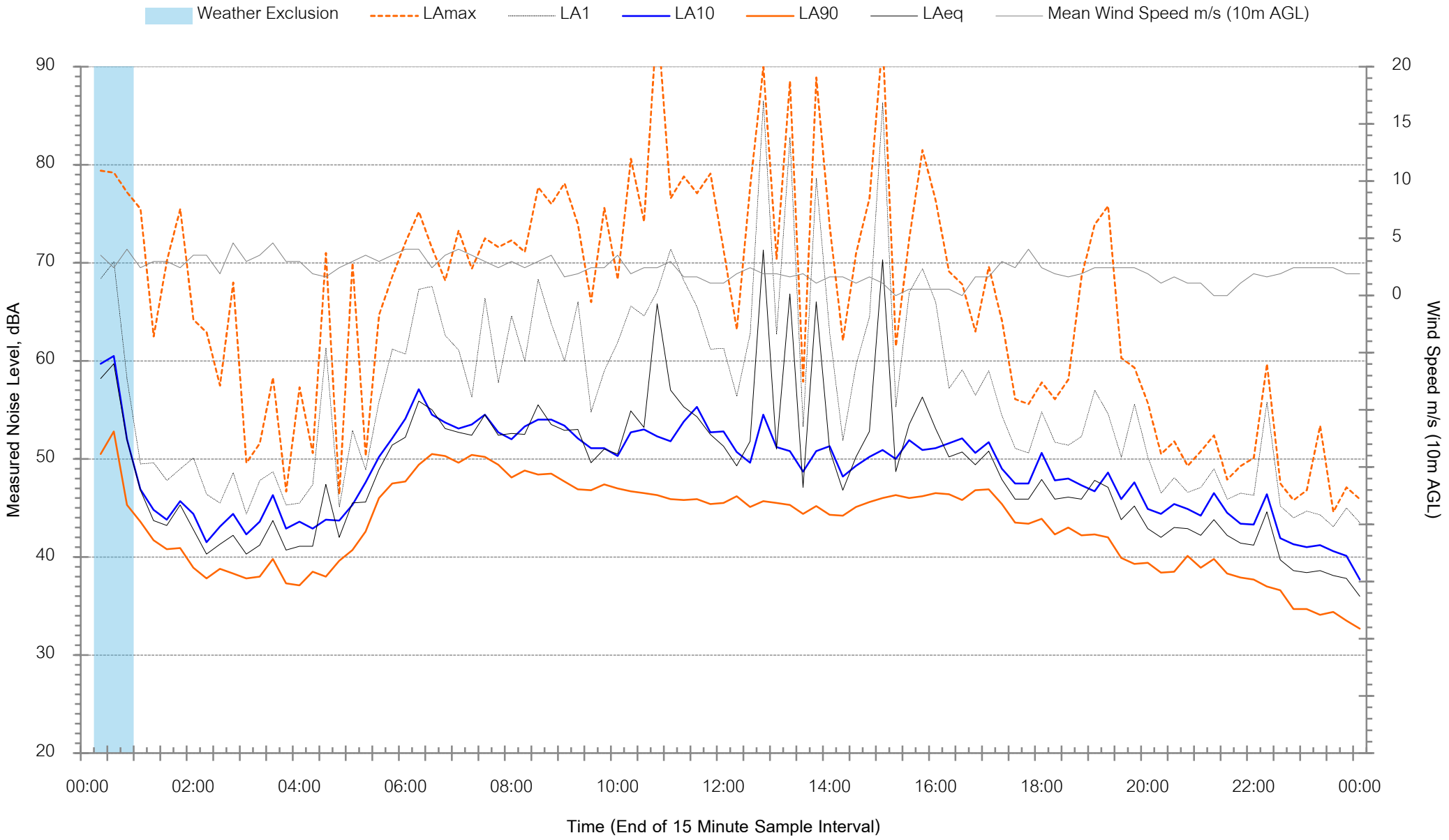
Background Noise Levels

IPD Terrey Hills, NSW - Thursday 6 June 2024



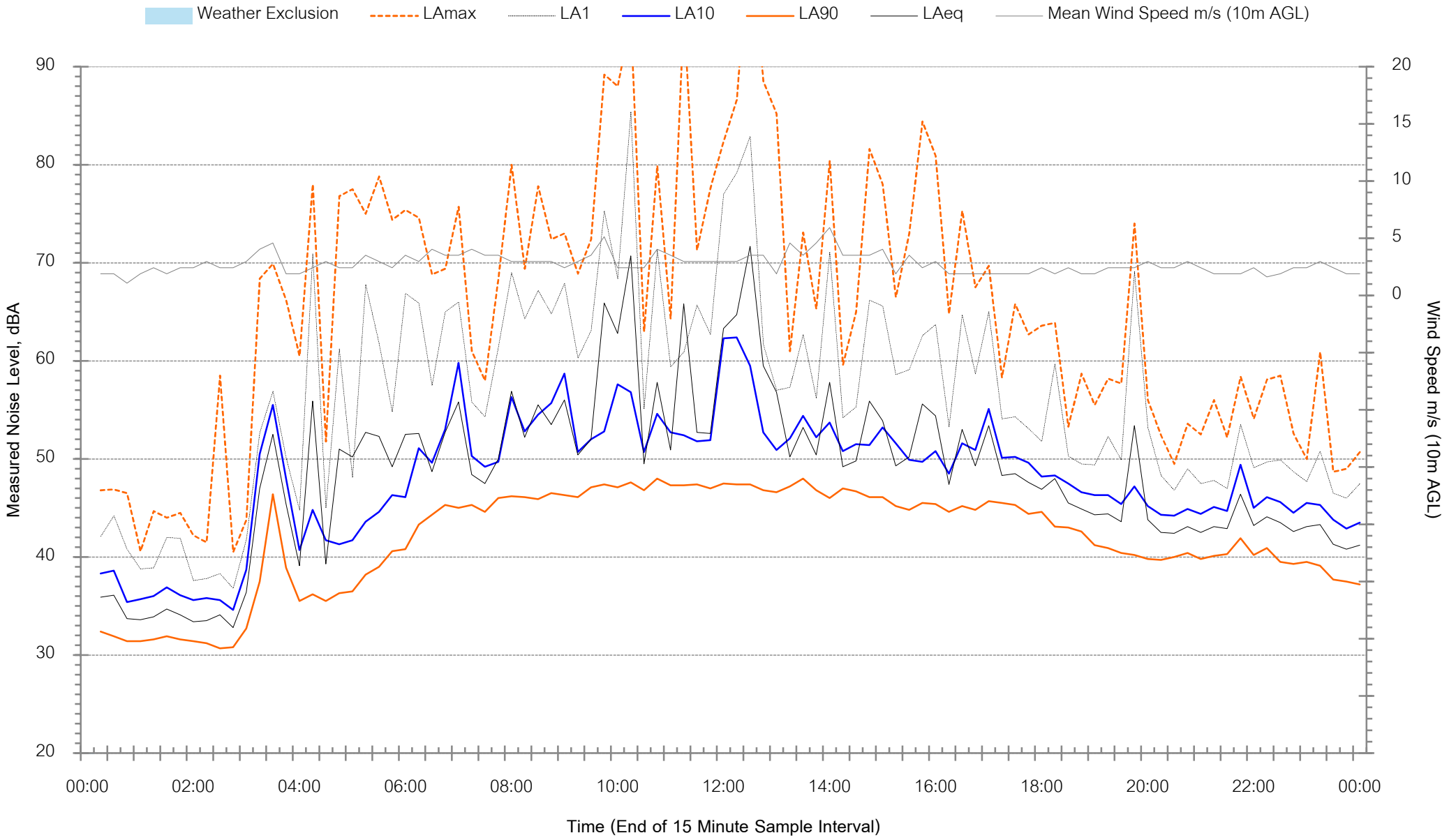
Background Noise Levels

IPD Terrey Hills, NSW - Friday 7 June 2024



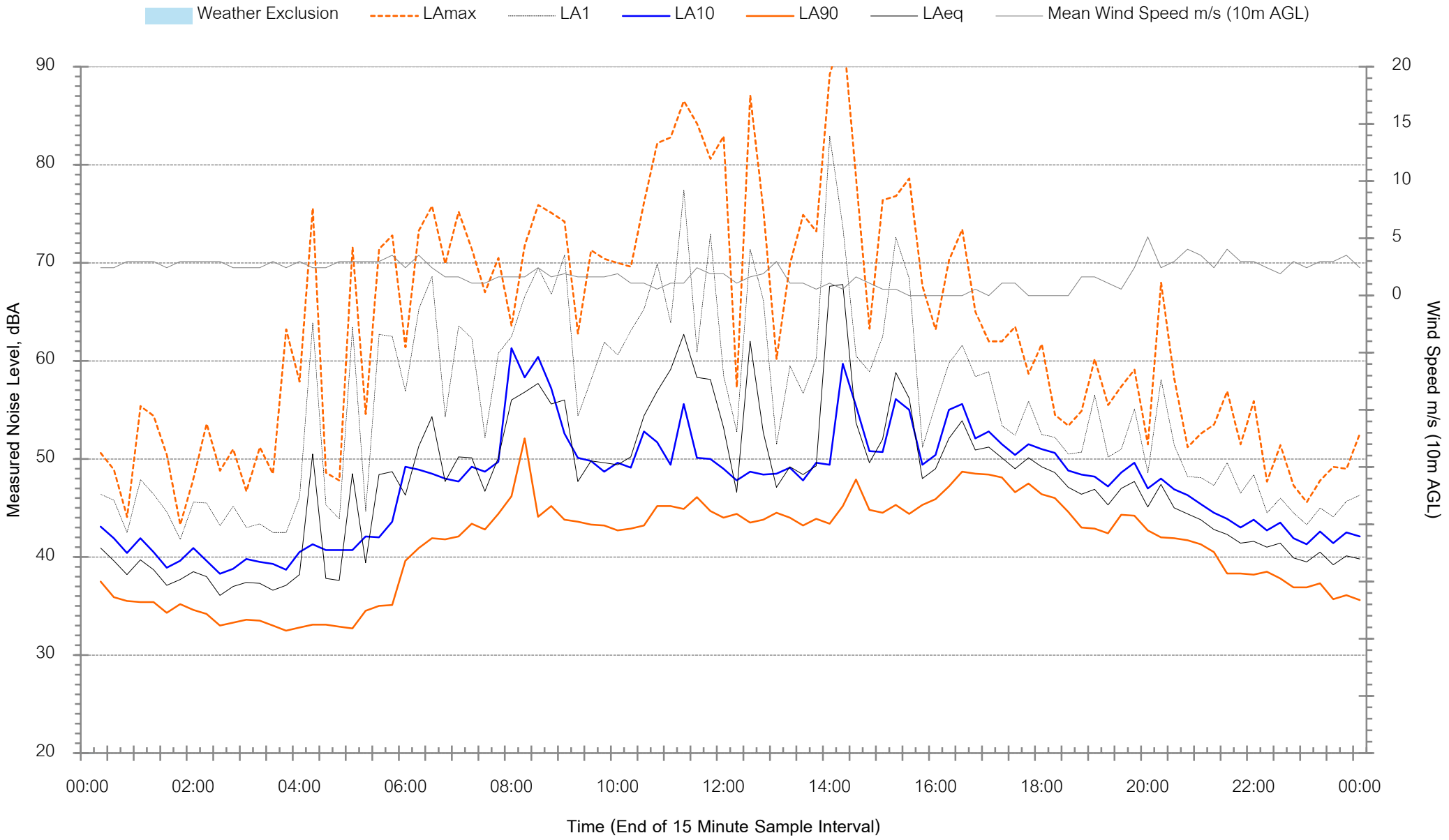
Background Noise Levels

IPD Terrey Hills, NSW - Saturday 8 June 2024



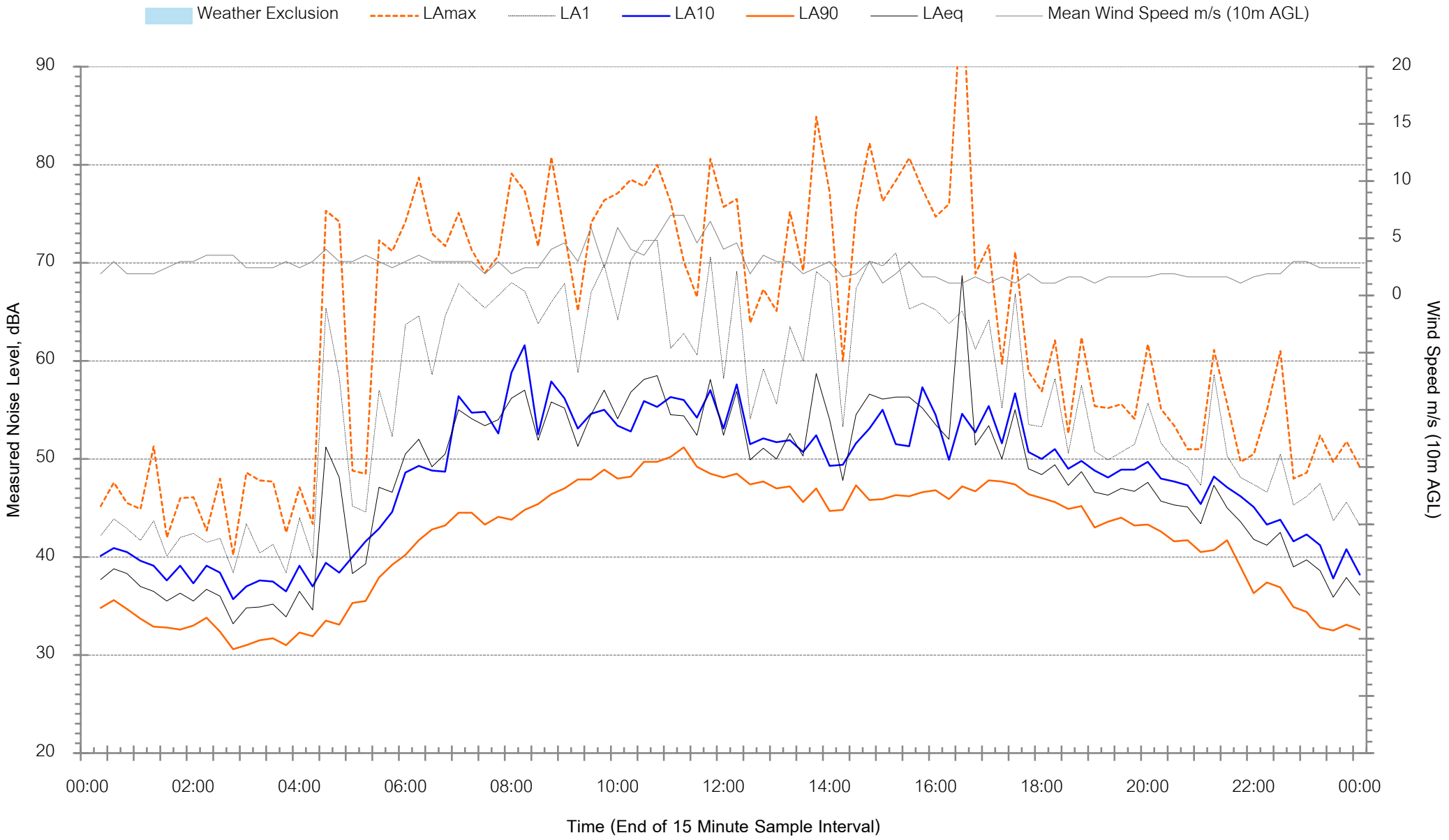
Background Noise Levels

IPD Terrey Hills, NSW - Sunday 9 June 2024



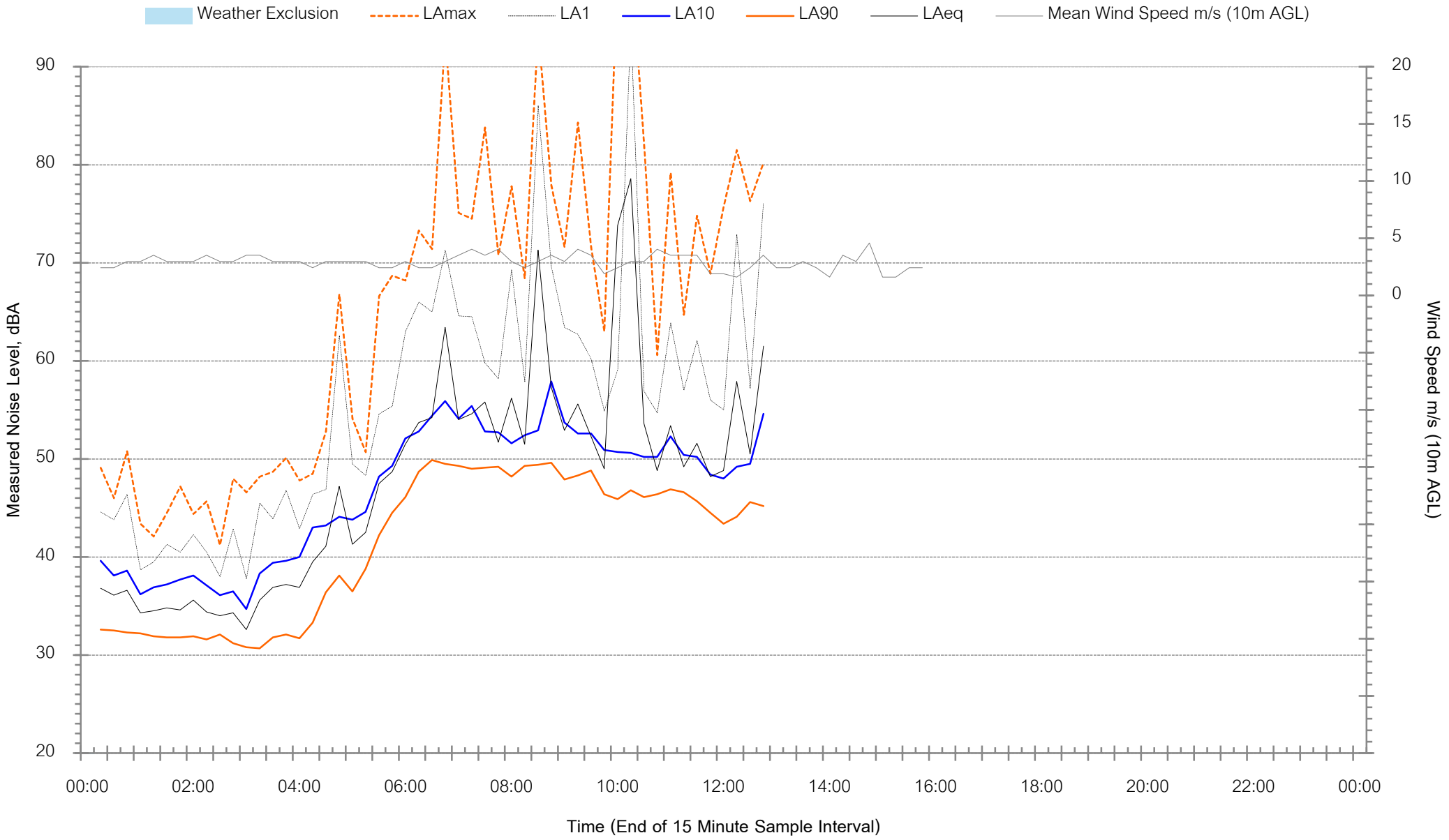
Background Noise Levels

IPD Terrey Hills, NSW - Monday 10 June 2024



Background Noise Levels

IPD Terrey Hills, NSW - Tuesday 11 June 2024



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Appendix D – Determination of NPI

Receiver Category

Table D25 - Determination of NPI Residential Receiver Category

Location/ Catchment	Period	Measured RBL dB $L_{A90(period)}$	Land Use Zone: RU1, RU2, RU4, R5, E4 (Rural)	Land Use Zone: RU5, RU6, R2, R3, R4, E2, E3 (Suburban)	Land Use Zone: R1, R4, B1, B2, B4 (Urban)	Land Use Zone: Others (Commercial, Industrial)	Typical Existing Background Noise Levels Table 2.3 NPI: RURAL Daytime <40 Eve <35 Night <30	SUBURBAN Daytime <45 Eve <40 Night <35	URBAN Daytime >45 Eve >40 Night >35	Rural Residential - an area with an acoustical environment that: 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	Suburban Residential - an area that has: 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.	Urban Residential- an area with an acoustical environment that: 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	45				✓			✓										✓	✓	
	Evening	40				✓			✓										✓	✓	
	Night	33				✓		✓											✓	✓	

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	1	**8**		0	1	2	0	0	0	0	0	0	0	0	3	3	0

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