Precise Planning

140 Ashwood Road, Wilton

Noise Impact Assessment

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Document Control

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1 Introduction

White Noise Acoustics has been engaged to undertake the Noise Impact Assessment of the operation of the proposed future use of the 140 Ashwood Road, Wilton property including a market garden.

This assessment includes the acoustic investigation into the potential for noise impacts generated from the operation of works undertaken on the site on surrounding properties including assessment within the relevant noise criteria including the Environmental Protection Authorities (EPA) Noise Policy for Industry (NPfI).

1.1 Site Location

The site is located on the property at 140 Ashwood Road, Wilton and includes a market garden including the construction of a new shed which will include the processing of produce ready for removal from the site.

The potentially affected receivers include the neighbouring properties which are detailed in the figures below.

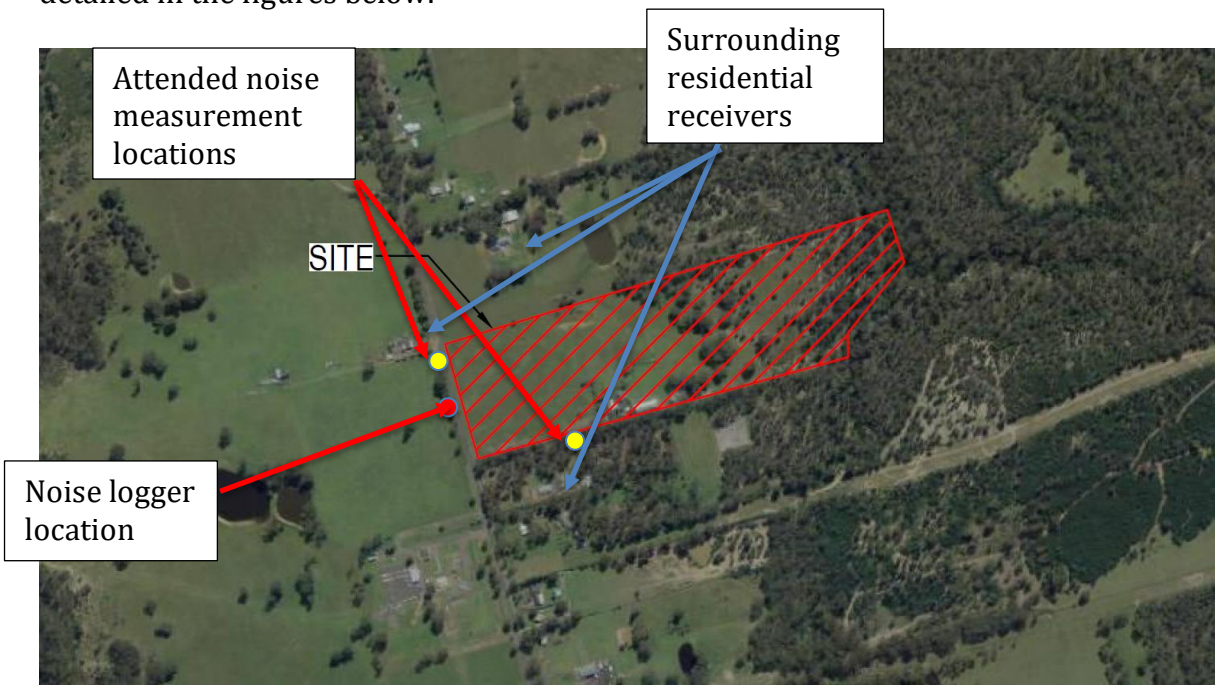


Figure 1 – 140 Ashwood Road, Wilton site location

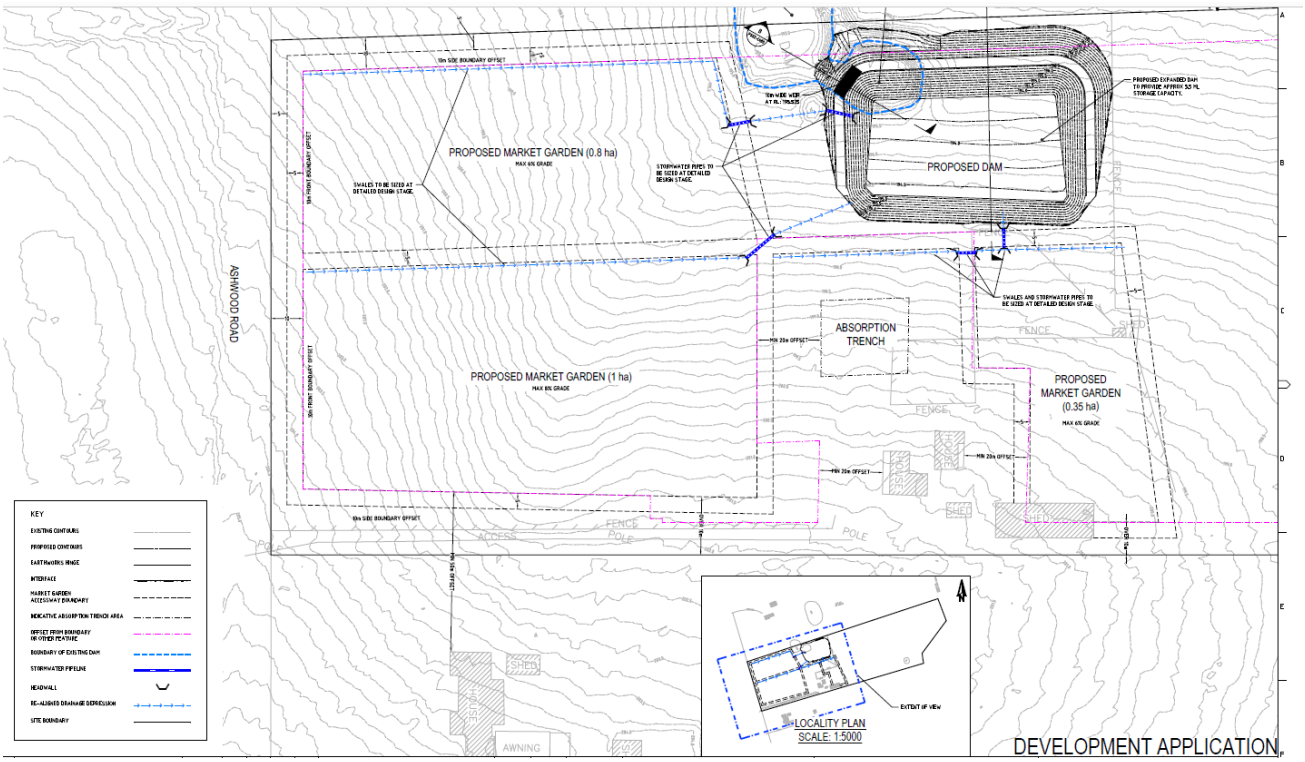


Figure 2 – Proposed site operations

2 Use of the Site

The proposed future use of the site is to include market garden including a future shed. See Figure 2 above for the location of the future shed on the site.

The use of the site and shed will include the following:

1. Use of the shed - following harvesting, produce is transferred by tractor to the cool-room, which will be constructed inside the shed. Typically, twice a week, (occasionally 3 times), produce is loaded onto one small, fixed axle pantechnicon truck by means of a forklift device attached to a tractor. The loading is done wholly within the proposed shed.
2. The forklift device does not have a reversing beeper.
3. The loading is undertaken during day and evening periods.
4. No scare guns are proposed.
5. The market gardens are tendered using mechanical equipment including tractors and other machines during daytime hours.

3 Existing Acoustic Environment

The 140 Ashwood Road, Wilton site is located with a *Rural* area as defined by the EPA NPfI, that is the environment is classified as the following:

> ***Rural*** *– an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse.*

The use of the requirements of the NPfI as defined by the *Rural* classification have been used in this report.

3.1 Attended Noise Survey Results

As part of this assessment an attended noise survey has been undertaken. The noise survey was undertaken on the 21st October, 2019.

The attended noise survey was undertaken to characterise the acoustic environment within the vicinity of the site as well as to assess the noise impacts generated from the future operations undertaken on the site.

Attended noise testing was conducted using a Bruel and Kjaer 2236C type meter. The meter was calibrated before and after testing and no significant drift was recorded.

The attended and unattended noise locations were selected to obtain suitable noise levels for the assessment of background noise levels ($L_{90\,(t)}$).

The results of the ambient noise level survey are detailed in Table 1 below. See Figure 1 above for the location of the noise level measurements.

Table 1 – Results of the Ambient Noise Survey at the Site

Measurement Location	Time of Measurement	$L_{Aeq,\ 15min}$ dB(A)	$L_{A90,\ 15min}$ dB(A)	Comments
To the north east of the site	9.15am to 9.30am	48	34	Ambient noise levels at the site and surrounding receivers was dominated by surrounding land uses and natural sounds as well as intermittent traffic on Ashwood Road
To the south of the site	9.35 to 9.50am	52	37	

3.2 Background Noise Logging

Continuous background noise logging has been undertaken at the site between the 15th and 21st October 2019 in accordance with the requirements of the NSW EPA.

Noise logging was undertaken using a RION NL-42EX type noise monitor with serial number 396932 and calibration with calibration number C19465. The noise logger was located on the site in a representative location to obtain background noise levels as detailed in Figure 1 above. The logger was positioned such that it was in a free field location and façade corrects were not required to be applied. Periods of inclement weather including precipitation and high wind have been excluded from the assessment of background levels as detailed in Appendix B.

The location of the noise logger on the site is detailed in the figure below.

Figure 2 – Noise Logger Installed at the site

The results of the unattended noise logging are detailed in the table below.

Table 2 – Results of the Noise Logging at the Site

Measurement Location	Time of Measurement	Maximum Repeatable $L_{Aeq, 15min}$ dB(A)	Representable Background noise Level (RBL) $L_{A90, 15min}$ dB(A)
Noise logger location, see figure 1 above	Day	47	35
	Evening	43	32
	Night	38	31

4 External Noise Emission Assessment

This section of the report details the relevant noise level criteria for noise emissions generated from the use of the site.

The relevant authority which provides the required noise level criteria for noise levels generated on the site includes the NSW Environmental Protection Authority's (EPA) Noise Policy for Industry (NPfI).

4.1 NSW Environmental Protection Authority, Noise Policy for Industry

The NSW Environmental Protection Authority (EPA) Noise Policy for Industry (NPfI), previously Industrial Noise Policy, details noise criteria for the control of noise generated from the operation of developments and the potential for impact on surrounding receivers.

The NPfI includes both intrusive and amenity criteria which are summarised below.

1. Intrusive noise level criteria, The NPfI states the following:

   'The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the LAeq descriptor), measured over a 15minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.'

2. Amenity noise level criteria, The NPfI states the following:

   'To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance.'

   Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB(A)

   Where the resultant project amenity noise level is 10 dB or more lower than the existing industrial noise level. In this case the project amenity noise levels can be set at 10 dB below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time.

The LAeq is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels, this policy assumes that the LAeq,15min will be taken to be equal to the LAeq, period + 3 decibels (dB), unless robust evidence is provided for an alternative approach for the particular project being considered.

Project amenity noise level (ANL) is urban ANL (Table 2.1) minus 5 dB(A) plus 3 dB(A) to convert from a period level to a 15-minute level (dB = decibel; dB[A] = decibel [A-weighted]; RBL = rating background noise level).

Noise level used in the assessment of noise emission from the site have been based on the noise level survey conducted at the site and detailed in this section of the report.

Consequently, the resulting noise level criteria are summarised in the table below. The criteria are nominated for the purpose of determining the operational noise limits for the operation of the site including mechanical plant associated with the development which can potentially affect noise sensitive receivers and operational noise levels from the future tenancies. For each assessment period, the lower (i.e. the more stringent) of the amenity or intrusive criteria are adopted. These are shown in bold text in the table below. The calculated *Project Amenity Noise Level* includes either the Recommended Amenity Noise Level minus 5 dB(A) plus 3 dB(A) (for a 15minum period) or the measured existing Leq noise level – 10 dB if this is greater as determined by the NPfI.

Table 3 – External Noise Level Criteria in Accordance with the NSW NPfI

Location	Time of Day	Project Amenity Noise Level, $L_{Aeq, period}$ [1] (dBA)	Measured $L_{A90, 15\ min}$ (RBL) [2] (dBA)	Measured $L_{Aeq, period}$ Noise Level (dBA)	Intrusive $L_{Aeq, 15\ min}$ Criterion for New Sources (dBA)
Rural residences	Day	48	35	47	**40**
	Evening	43	33	47	**38**
	Night[4]	38	N/A	N/A	N/A

Note 1: Project Amenity Noise Levels corresponding to "Rural" areas, recommended noise levels.
Note 2: L_{A90} Background Noise or Rating Background Level
Note 3: Project Noise Trigger Levels are shown in bold
Note 4: As the site is not operational during Evening or Night time periods assessment during these times is not required.

4.2 Noise Impact Assessment

An assessment of noise generated on the future site has been undertaken in this section of the report.

The assessment of noise levels generated on the site has been based on the measured noise levels detailed in the section above and the noise levels generated from the future use of the site. The expected noise levels of the future site (including the shed) have been based on recorded noise levels previously conducted of similar equipment, including the following:

1. Tractor in use – 65 dB(A) $Leq_{(t)}$ @ 7m
2. Loading of materials onto truck – up to 60 dB(A) $Leq_{(1\ min)}$ @ 7m
3. Use of forklift on a tractor - 70 dB(A) $Leq_{(1\ min)}$ @ 7m
4. People Talking – 65 dB(A) dB(A) $Leq_{(1\ min)}$ @ 2m

Based on the proposed operations detailed above and the recommended acoustic treatments and controls detailed in Section 4.3 of this report the calculated noise levels at the surrounding residential receivers are detailed in the table below.

Table 4 – Calculated Noise Impact from the Site

Receiver Location	Activities in Operation	NPfl Noise Level Criteria, $L_{Aeq\ (15min)}$ (dBA)	Calculated $L_{Aeq\ (15min)}$ Noise Level	Comments	Compliance?
Neighbouring receiver to the south	Use of the future shed for produce handling and loading of the truck for removal from the site internally	40 Day time 38 Evening period	<37 daytime	Providing acoustic treatments and controls included in Section 4.3 are included	Yes
Neighbouring receiver to the north west		40 Day time 38 Evening period	<37 daytime		Yes
Neighbouring receiver to the north		40 Day time 38 Evening period	<37 daytime		Yes
Neighbouring receiver to the south	Tending of the gardens including use of tractors and forklifts	40 Day time	<40 daytime	Providing acoustic treatments and controls included in Section 4.3 are included including tending of gardens during day time hours only	Yes
Neighbouring receiver to the north west		40 Day time	<40 daytime		Yes
Neighbouring receiver to the north		40 Day time	<40 daytime		Yes
Neighbouring receiver to the south	Operation of mechanical services equipment	40 Day time 38 Evening period	<36	Mechanical equipment to be treated once plant items are known	Yes
Neighbouring receiver to the north west		40 Day time 38 Evening period	<36		Yes
Neighbouring receiver to the north		40 Day time 38 Evening period	<36		Yes

Note 1: Location of noise level measurements are detailed in Figure 1 of this report.

4.3 Acoustic Treatment and Controls

The recommended acoustic treatments and controls for the operation of the proposed market gardens located on the 140 Ashwood Road, Wilton site to ensure noise emissions comply with the relevant EPA including the following:

1. Tending of the general Market Garden areas to be undertaken during daytime hours.
2. The use of the shed during the evening periods for the processing and loading of trucks can be undertaken during evening periods.
3. The shed is to be orientated such that the open side faces away from the neighbouring boundary.
4. Truck engines are to be turned off when loading is occurring.
5. Shed not to be used during night-time periods (10pm to 7am).
6. The shed is to be constructed from metal construction.
7. All plant and equipment located externally to the shed are to be assessed by an acoustic consultant prior to installation and any required treatments required to comply with the noise level emission criteria detailed in the report detailed.
8. All other removals and deliveries are to be undertaken during daytime hours.
9. An assessment of the mechanical equipment to be undertaken once plant items are selected and noise levels are known. Typical acoustic treatments may include the following:
    a. Installing plant items within the shed when possible.
    b. External equipment such as condensers to be located behind acoustic screens.
    c. Duct work servicing equipment to be internally lined.
    d. Details of specific treatments to be provided as part of the detailed design of the project and in compliance with the noise level criteria detailed in this report.

Providing the recommended treatments and controls detailed above are applied to the proposed 140 Ashwood Road site noise levels emissions will comply with the relevant EPA NPfI requirements.

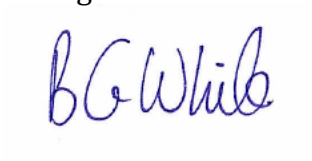
5 Conclusion

This report details the Noise Impact Assessment of the noise emissions generated from the use of the 140 Ashwood Road, Wilton site Oatley for Market Gardens including the future use of the proposed shed located on the site.

Providing all the proposed acoustic treatment and controls detailed in Section 4.3 of this report are included in the construction and operation of the site then noise level emissions will comply with the requirements of the EPA's Noise Policy for Industry.

For any additional information please do not hesitate to contact the person below.

Regards



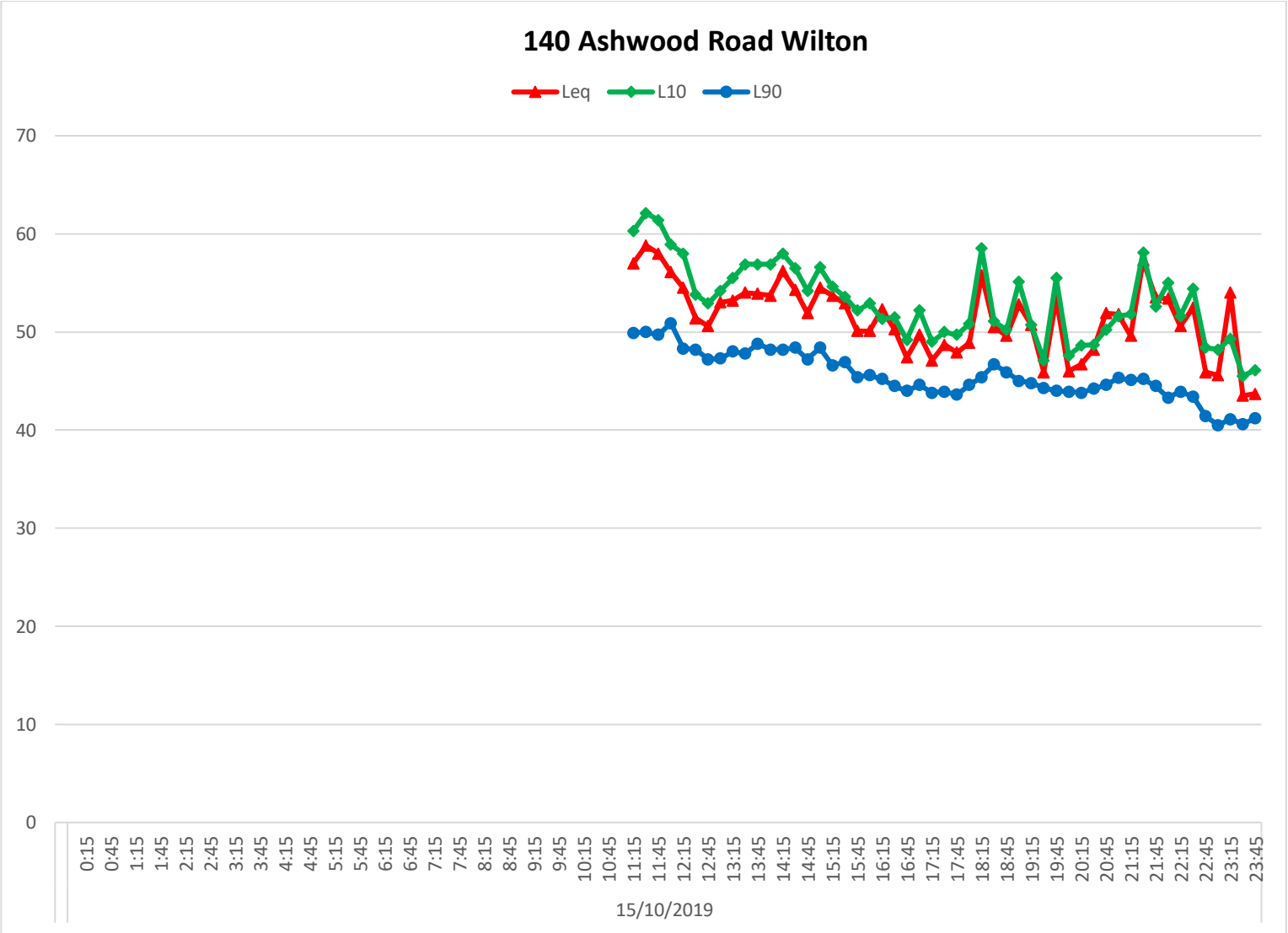
Ben White
Director
White Noise Acoustics

6 Appendix A – Glossary of Terms

Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds; 0dB the faintest sound we can hear 30dB a quiet library or in a quiet location in the country 45dB typical office space. Ambience in the city at night 60dB Martin Place at lunch time 70dB the sound of a car passing on the street 80dB loud music played at home 90dB the sound of a truck passing on the street 100dB the sound of a rock band 115dB limit of sound permitted in industry 120dB deafening
dB(A)	*A-weighted decibels* The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Frequency	Frequency is synonymous to *pitch*. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Background Sound Low	The average of the lowest levels of the sound levels measured in an affected area in the absence of noise from occupants and from unwanted, external ambient noise sources. Usually taken to mean the L_{A90} value
Ctr	A frequency adaptation term applied in accordance with the procedures described in ISO 717.
dB (A)	'A' Weighted overall sound pressure level

Noise Reduction	The difference in sound pressure level between any two areas. The term “noise reduction” does not specify any grade or performance quality unless accompanied by a specification of the units and conditions under which the units shall apply
NR Noise Rating	Single number evaluation of the background noise level. The NR level is normally around 5 to 6 dB below the “A” weighted noise level. The NR curve describes a spectrum of noise levels and is categorised by the level at 1000 Hz ie the NR 50 curve has a value of 50 dB at 1000 Hz. The NR rating is a tangential system where a noise spectrum is classified by the NR curve that just encompasses the entire noise spectrum consideration.
R_w	Weighted Sound Reduction Index - Laboratory test measurement procedure that provides a single number indication of the acoustic performance of a partition or single element. Calculation procedures for Rw are defined in ISO 140-2:1991 “Measurement of Sound Insulation in Buildings and of Building Elements Part 2: Determination, verification and application of precision data”.
R'_w	Field obtained Weighted Sound Reduction Index - this figure is generally up to 3-5 lower than the laboratory test determined level data due to flanked sound transmission and imperfect site construction.
Sound Isolation	A reference to the degree of acoustical separation between any two areas. Sound isolation may refer to sound transmission loss of a partition or to noise reduction from any unwanted noise source. The term “sound isolation” does not specify any grade or performance quality and requires the units to be specified for any contractual condition
Sound Pressure Level, L_P dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, L_W dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt
Speech Privacy	A non-technical term but one of common usage. Speech privacy and speech intelligibility are opposites and a high level of speech privacy means a low level of speech intelligibility. It should be recognised that acceptable levels of speech privacy do not require that speech from an adjacent room is inaudible.
Transmission Loss	Equivalent to Sound Transmission Loss and to Sound Reduction Index in terminology used in countries other than Australia. A formal test rating of sound transmission properties of any construction, by usually a wall, floor, roof etc. The transmission loss of all materials varies with frequency and may be determined by either laboratory or field tests. Australian Standards apply to test methods for both situations.

7 Appendix B – Noise Logging Results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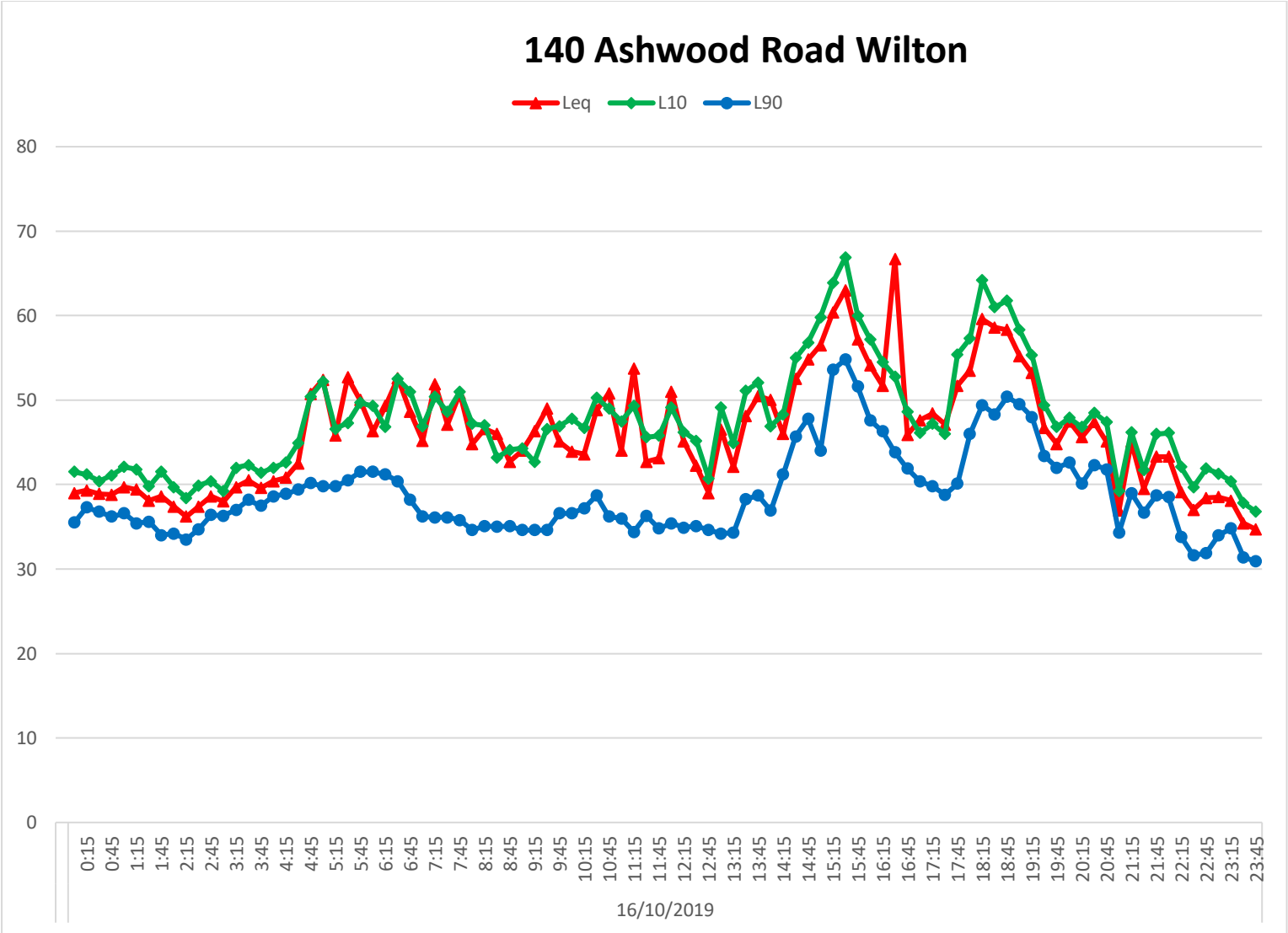
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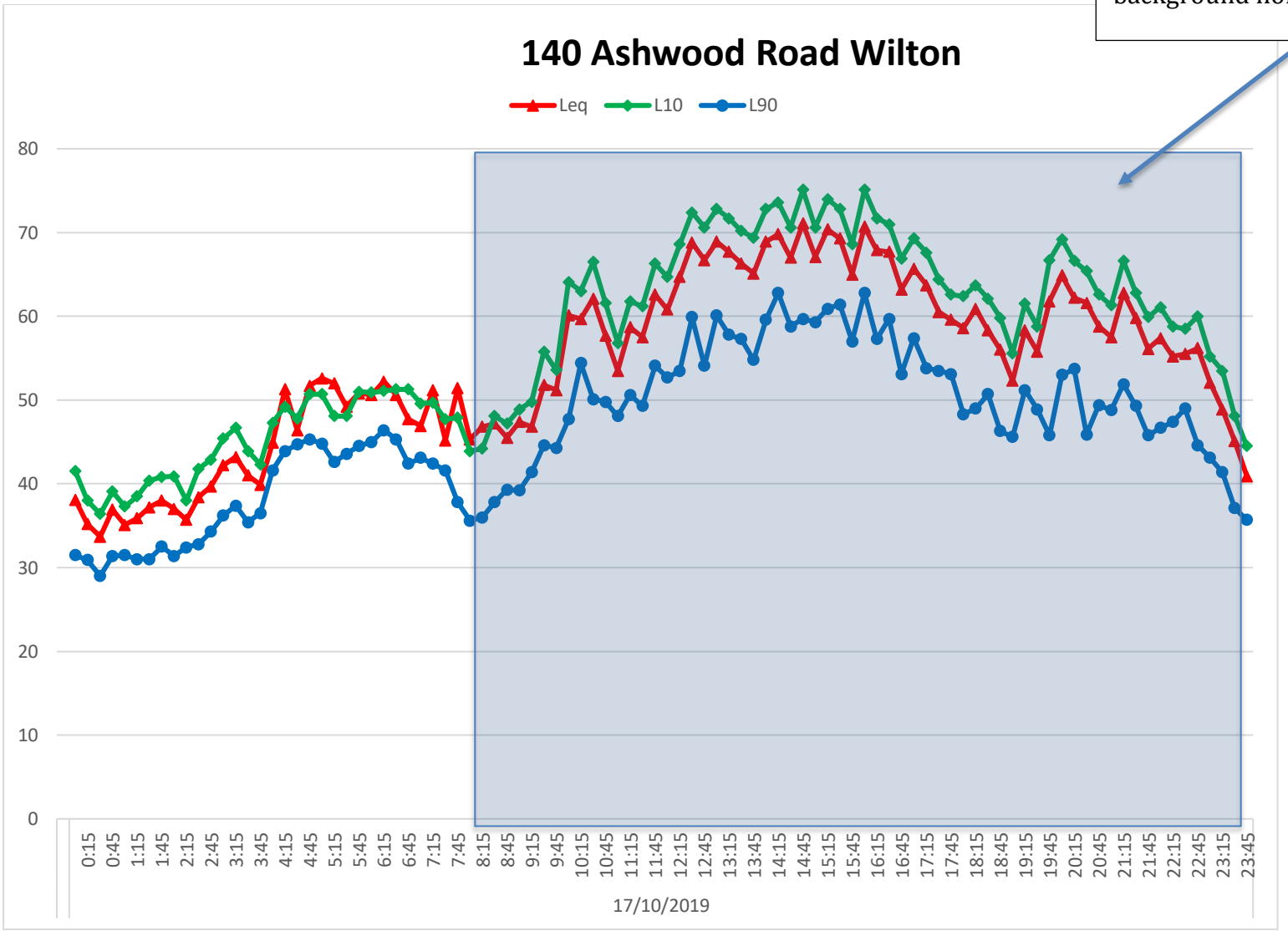
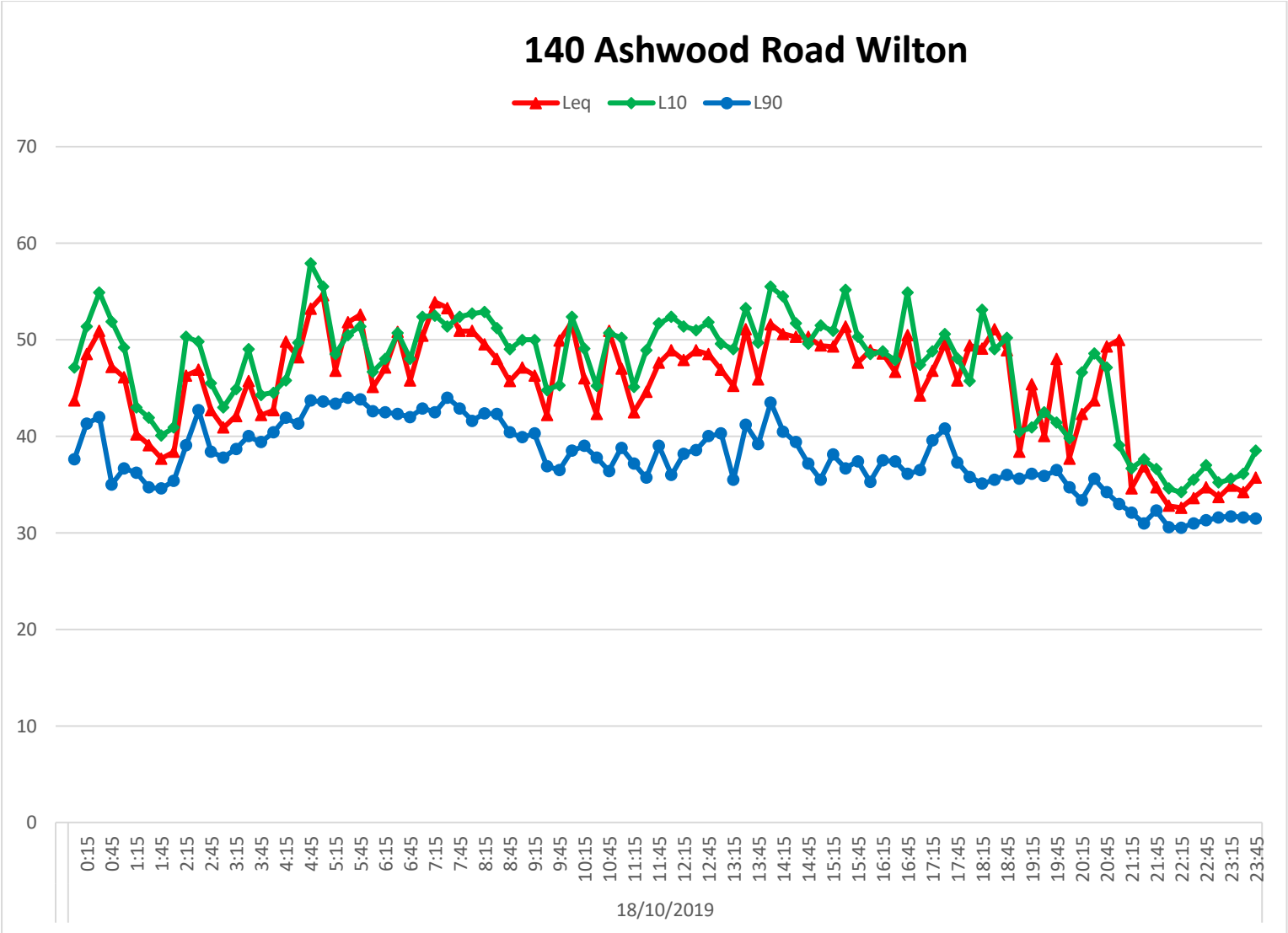


Period of extraneous noise, this period is not included in the background noise assessment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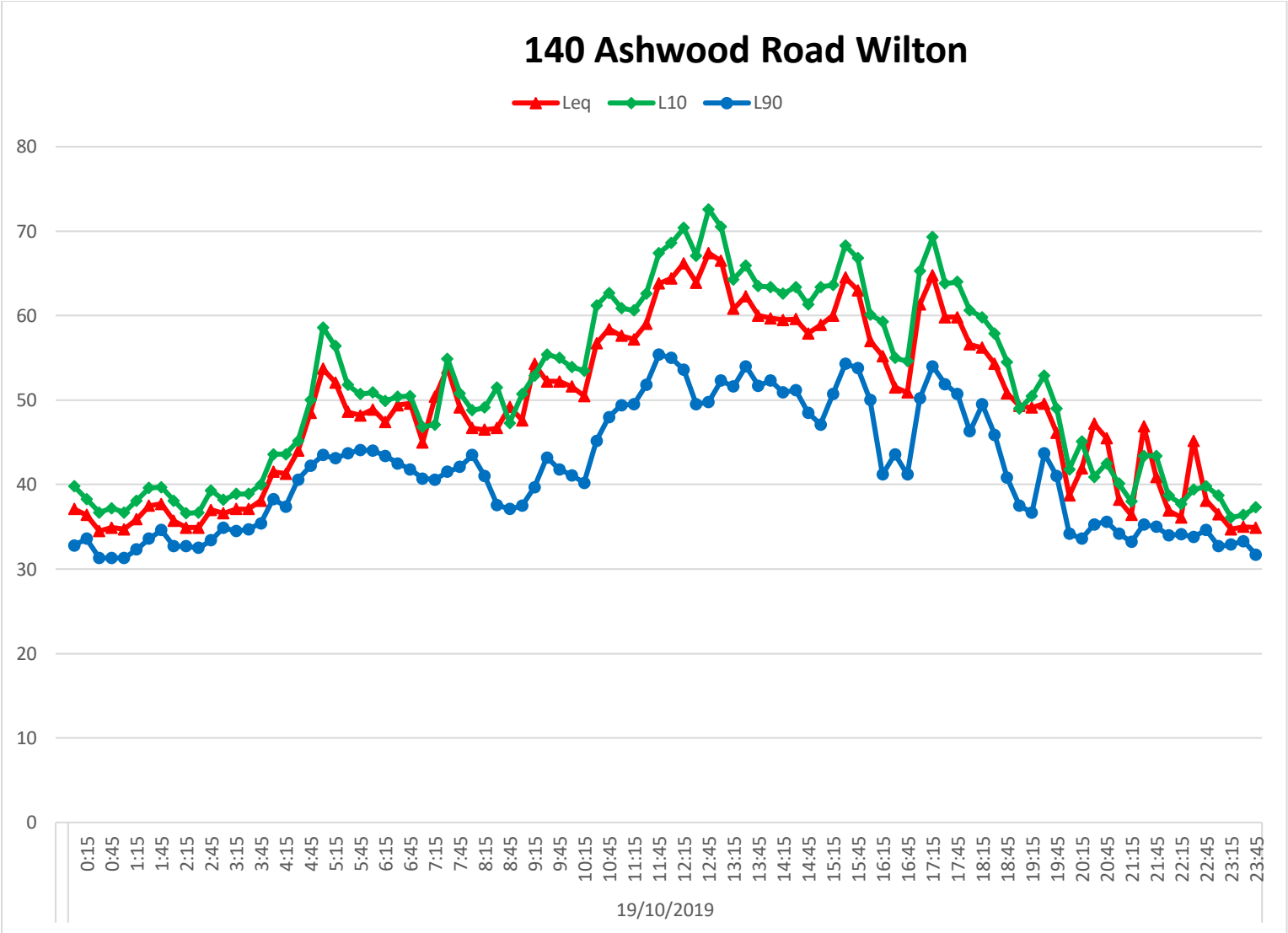
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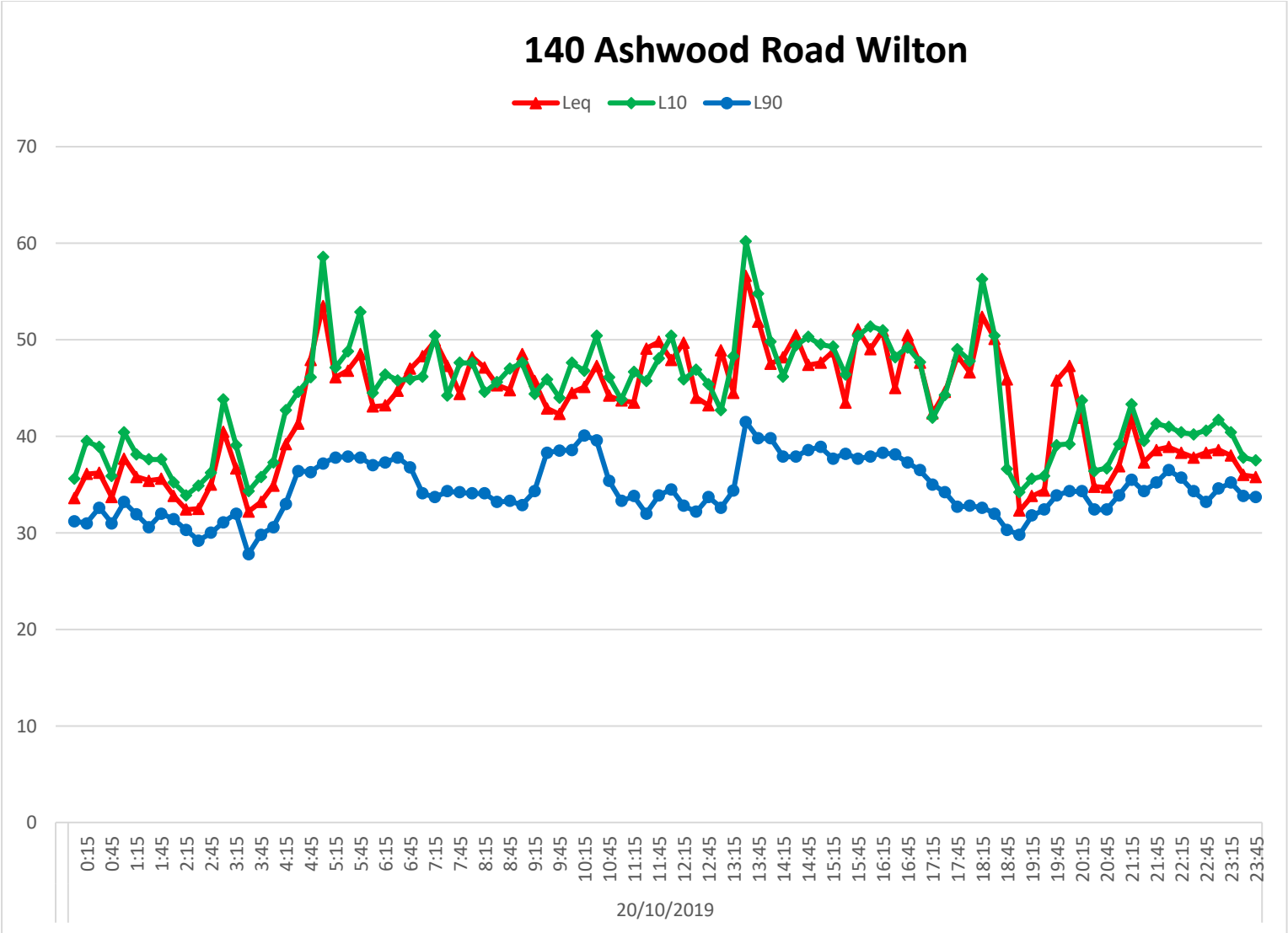
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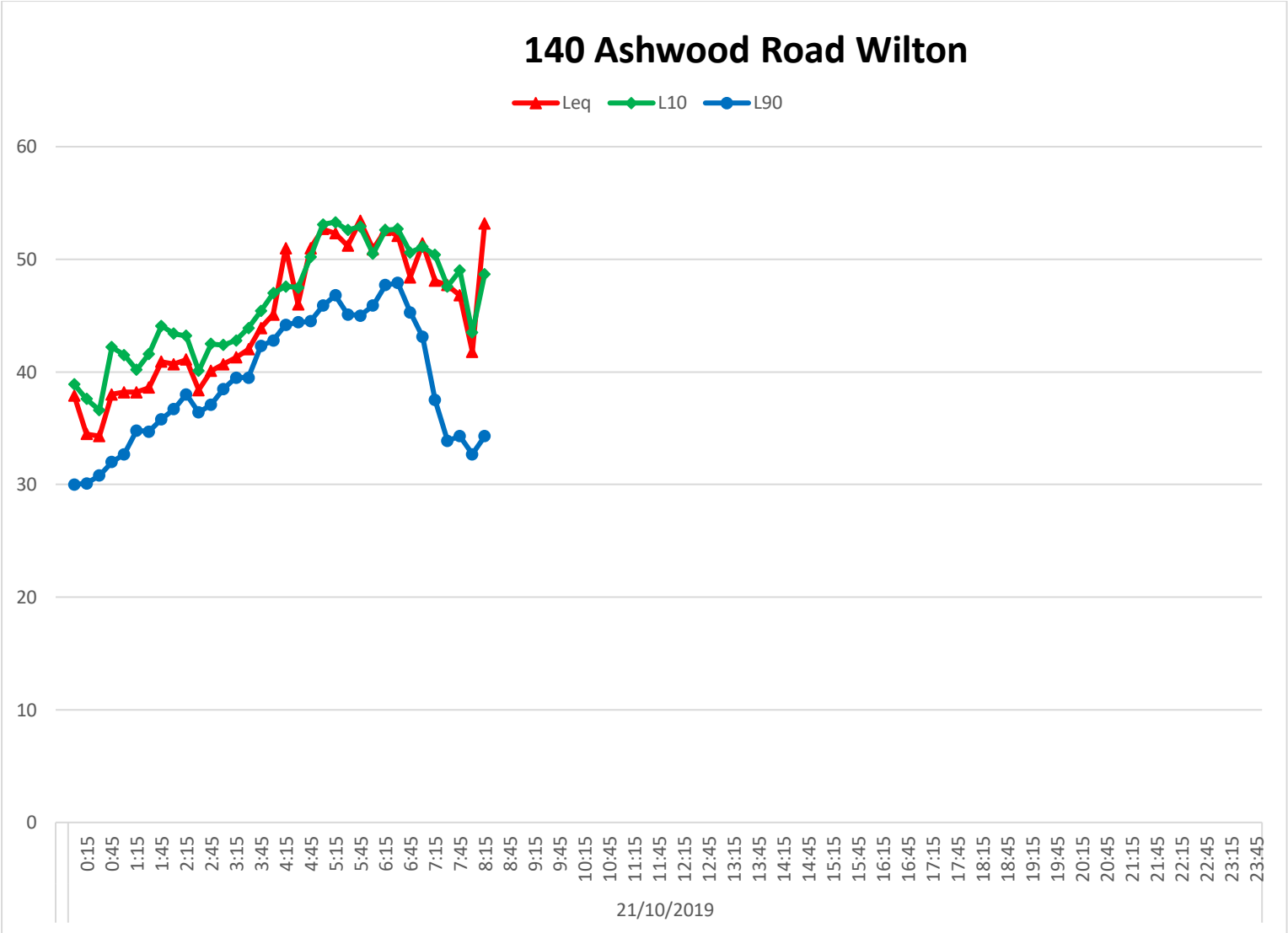
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8 Appendix C – Noise Logger Calibration Certificate

Acoustic Research Labs Pty Ltd
Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2013

Calibration Certificate
Calibration Number C19465

Client Details	White Noise Acoustics 303, 74 Pitt Street Sydney NSW 2000
Equipment Tested/ Model Number :	Rion NL-42EX
Instrument Serial Number :	00396932
Microphone Serial Number :	180593
Pre-amplifier Serial Number :	87945

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	23.7°C	**Ambient Temperature :**	23.8°C
Relative Humidity :	42.1%	**Relative Humidity :**	43.1%
Barometric Pressure :	101.93kPa	**Barometric Pressure :**	101.9kPa

Calibration Technician : Lucky Jaiswal
Secondary Check: James Jepsen
Calibration Date : 2 Aug 2019
Report Issue Date : 5 Aug 2019
Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.15dB*	*Temperature*	*±0.2°C*
12.5kHz	*±0.2dB*	*Relative Humidity*	*±2.4%*
16kHz	*±0.29dB*	*Barometric Pressure*	*±0.015kPa*
Electrical Tests			
31.5 Hz to 20kHz	*±0.11dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

Accredited for compliance with ISO/IEC 17025 - calibration.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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