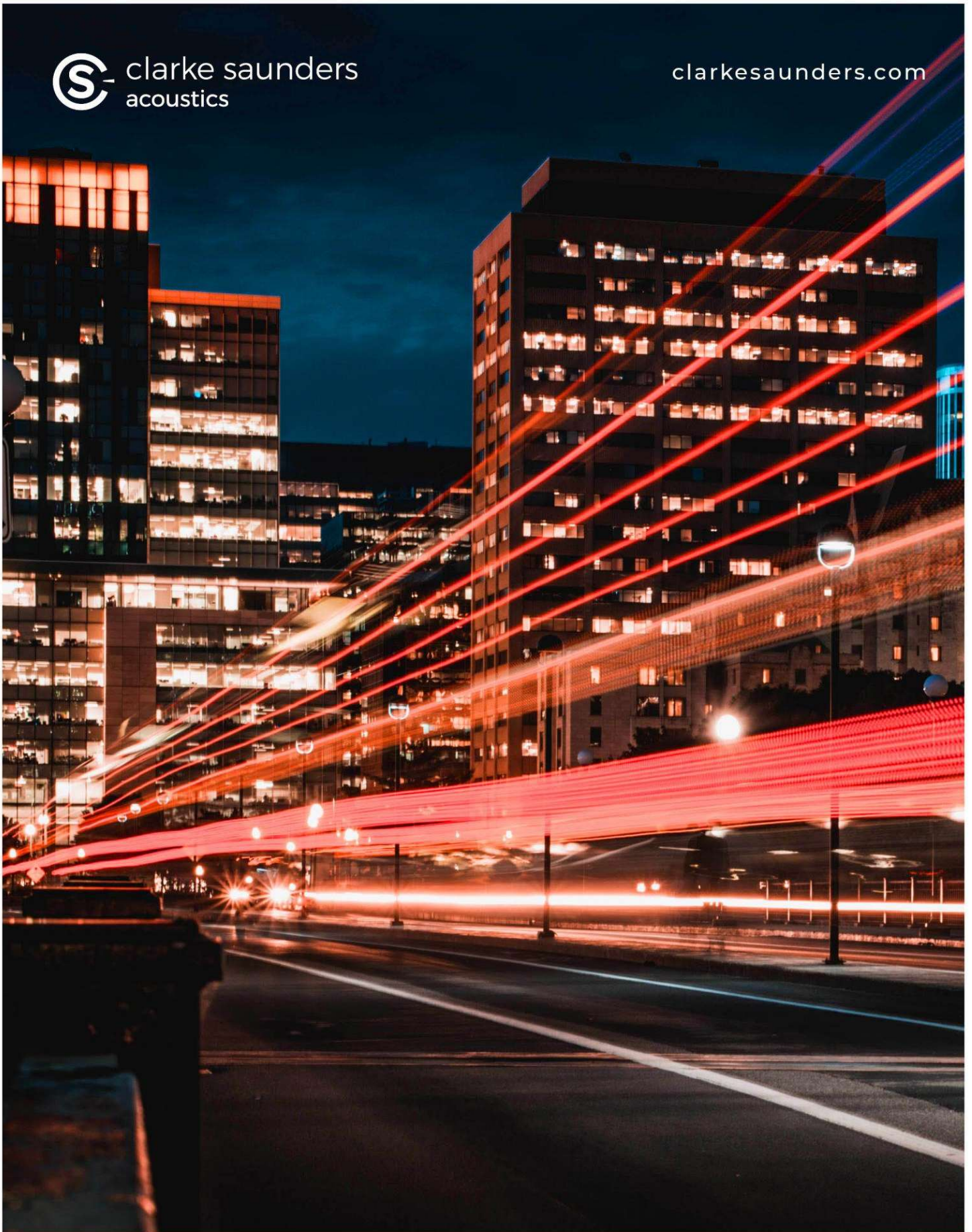




PREPARED: Tuesday, 18 August 2026

YAPTON ROAD, WALBERTON NOISE IMPACT ASSESSMENT

CONTENTS

1.0	EXECUTIVE SUMMARY	1
2.0	INTRODUCTION	1
3.0	CONDITIONS	2
4.0	SITE DESCRIPTION & SURROUNDINGS	2
5.0	LOCAL AUTHORITY LIAISON	3
6.0	ENVIRONMENTAL NOISE SURVEY	4
7.0	CONDITION DISCHARGE	7
8.0	UNCERTAINTY	13
9.0	CONCLUSION	14

LIST OF ATTACHMENTS

AS11980/SP1	Indicative Site Plan
AS11980/TH1-TH15	Environmental Noise Time Histories
APPENDIX A	Acoustic Terminology
APPENDIX B	BS4142:2014+A.1:2019 Summary

Project Ref:	AS11980	Title:	Yapton Lane, Walberton
Report Ref:	AS11980.260706.NIA.2.2	Title:	Noise Impact Assessment
Client Name:	Doswell Homes		
Project Manager:	Andrew Nesbitt		
Report Author:	Andrew Nesbitt		
Clarke Saunders Acoustics Winchester SO22 5BE		This report has been prepared in response to the instructions of our client. It is not intended for and should not be relied upon by any other party or for any other purpose.	

1.0 EXECUTIVE SUMMARY

- 1.1 Outline planning consent was previously granted for residential development of up to 48 dwellings and a dental surgery within Arun District Council at the Land West of Yapton Lane, Walberton, BN18 0AS in January 2022 following an appeal decision (Appeal Ref: APP/C3810/W/22/3309365). Conditions regarding noise impact at the site remain outstanding, however, no further objections were raised by Environmental Health as part of a subsequent Reserved Matters application (application ref: WA/52/24/RES).
- 1.2 Doswell Homes has since taken over as design and build contractor for the site, proposing minor alterations to the scheme as part of a Non-Material Amendment (NMA) application, primarily related to the omission of garages. Clarke Saunders Acoustics (CSA) has, therefore, reviewed the updated site and plot layouts to address subsequent variation in potential noise impact.
- 1.3 Both the site and dwelling layouts are generally similar, and the façade specifications associated with the consented proposal remain applicable. Environmental noise levels in external amenity spaces also remain suitable for residential development.
- 1.4 A 2-metre-high timber barrier along the boundary with DM Chainsaws will be installed, replacing the previously proposed 2-metre-high brick wall. This is due to constraints related to the minimum clearance requirements from the adjacent pumping station which conflict with the approved landscaping plans and local ground conditions. Specifications have been provided for a robust barrier, with consideration to longevity as well as the required specific mass to maintain the targeted screening losses.
- 1.5 The noise impact assessment has demonstrated that the relevant noise planning conditions can be achieved through implementation of the mitigation measures outlined within this report, and can be subsequently discharged.

2.0 INTRODUCTION

- 2.1 Doswell Homes is seeking to develop the Land West of Yapton Lane, Walberton, BN18 0AS with residential dwellings and a dental surgery. Outline planning permission granted through appeal (Ref: APP/C3810/W/22/3309365).
- 2.2 The site comprises agricultural land, as shown in the appended site plan, AS11980/SP1. To the north-east there is a garden machinery supplier, 'DM Chainsaws', which specialises in the selling and servicing of chainsaws and other outdoor tools.
- 2.3 Three noise-related planning conditions were imposed to protect future residents from noise associated with DM Chainsaws and to ensure acceptable internal and external noise levels. These conditions remain outstanding, however no further objections were raised by Environmental Health in the Reserved Matters application (Ref: WA/52/24/RES) based on technical information contained in CSA's Noise Impact Assessment (Ref: AS11980.240426.NIA.1.0).
- 2.4 The proposed scheme by Doswell Homes is largely identical to that in the previously consented Reserved Matters application (WA/52/24/RES), with the omission of garages, addition of a pumping station to the west, and internal alterations of plot layouts.

- 2.5 Doswell Homes has commissioned CSA to review the scheme changes and verify that the new proposal still complies with the relevant noise planning conditions, with a view to formally discharge.
- 2.6 Please refer to Appendix A for details of the acoustic terminology used throughout this report.

3.0 CONDITIONS

- 3.1 The Schedule of Conditions outlines the following conditions related to noise impact on the proposed development:

CONDITION 8

No development shall commence until an acoustic assessment has been undertaken to determine the impact of noise from commercial related noise sources (including DM Chainsaws) on the proposed dwellings. The results of the assessment and details of a scheme of mitigation measures necessary to ensure an appropriate level of aural amenity within habitable rooms and amenity in garden areas shall be submitted and approved in writing by the local planning authority. All works which form part of the approved scheme shall be completed before any part of the development is occupied and shall thereafter be maintained in accordance with the approved details.

CONDITION 12

Prior to the commencement of the development hereby approved, a scheme to demonstrate that the internal noise levels within the residential units will conform to the 'Indoor ambient noise levels for dwellings' guideline values specified within Table 4 under section 7.7.2 of BS 8233:2014 shall be compiled by a competent acoustician on sound insulation and noise reduction for buildings and shall be submitted to and approved in writing by the local planning authority. The scheme should take into account the correct number of air changes required for noise affected rooms. The works specified in the approved scheme shall then be carried out in accordance with the approved details prior to occupation of the premises and be retained thereafter.

CONDITION 13

Prior to the commencement of the development hereby approved, a scheme to demonstrate that the external noise levels within the curtilage of residential units will conform to the 'Design criteria for external noise' upper guideline value of 55dB LAeq,T [sic.] as specified within section 7.7.3.2 of BS 8233:2014 shall be prepared.

Guidance on sound insulation [sic.] and noise reduction for proposed development shall be submitted to and approved in writing by the local planning authority. The work specified in the approved scheme shall then be carried out in accordance with the approved details prior to occupation of the premises and be retained thereafter.

4.0 SITE DESCRIPTION & SURROUNDINGS

- 4.1 The site is in a rural area and is currently used as agricultural land. It is bounded by Yapton Lane to the east and further agricultural land to the south and west. To the north-west and north-east lie Walberton Place Care Home and DM Chainsaws Ltd, respectively, where the northern site boundary is shared with the respective access road.

- 4.2 The soundscape across the site is primarily determined by nearby agricultural activity and road traffic from Yapton Lane, as well as commercial noise from DM Chainsaws Ltd as detailed below.
- 4.3 DM Chainsaws Ltd supplies, maintains and repairs garden machinery products. This includes, but is not limited to:
- lawnmowers (both standing and ride-on);
 - hedge cutters;
 - strimmers;
 - chainsaws;
 - woodchippers.
- 4.4 Operational hours for DM Chainsaws Ltd are as follows:
- Monday, Tuesday, Thursday, Friday: 08:00 – 17:00;
 - Wednesday: 08:00 – 18:30;
 - Saturday: 08:00 – 12:00;
 - Sundays and Bank Holidays: Closed.
- 4.5 As part of its operation, it is common practice to test the machinery and replicate faults whilst operating under various loads. This may be to diagnose the problem or to test whether it has been fixed. There are a number of workshops within the premises to repair the equipment and it is generally tested externally at the rear testing area shown in site plan AS11980/SP1. It is advised by DM Chainsaws Ltd that woodchippers are not brought to the rear testing area but are typically tested adjacent to their car park or within the central courtyard.
- 4.6 It is understood that Walberton Place Care Home, located around 100 metres from the rear testing area, has co-existed for a number of years with DM Chainsaws Ltd without noise complaint.
- 4.7 The façade of the nearest proposed dwelling is around 20 metres from the rear machinery testing area.

5.0 LOCAL AUTHORITY LIAISON

- 5.1 CSA contacted Mr David Denham, an Environmental Health Officer at Arun District Council, on week commencing 13th May 2024 to discuss the requirements of Condition 8. This condition requires the noise impact from the commercial premises, DM Chainsaws Ltd, to be mitigated so that an appropriate level of aural amenity may be maintained within habitable rooms and garden areas of the development. “Amenity” is not defined exhaustively in national or local legislation or regulations and there is, consequently, a degree of subjectivity involved in this condition.
- 5.2 As discussed with Mr Denham, given low to moderate background sound levels in a rural environment, a level of noise from the proposed machinery is to be expected across the site, when the machinery is tested externally. Inaudibility is, therefore, not considered an appropriate target for the development, nor is it reflective of an appropriate level of aural amenity.

- 5.3 It is understood that a number of other nearby receptors have co-existed with DM Chainsaws Ltd without problems regarding the existing level of impact, namely Walberton Care Home to the west and a number of other detached dwellings to the north.
- 5.4 Walberton Care Home in its existing form, has direct line of sight to the testing area, where the site engineer noted that noise from the DM Chainsaw Ltd testing area was audible at the shared boundary.
- 5.5 It would, therefore, be considered a good indicator of acceptability where similar noise levels are achieved by noise emissions from the commercial source to the proposed development.

6.0 ENVIRONMENTAL NOISE SURVEY

- 6.1 An automated survey of the existing ambient noise levels was undertaken at the site at positions LT1 and LT2 as shown on AS11980/SP1. Further verification measurements were undertaken at position LT3, circa 8 metres from the rear testing area.
- 6.2 The noise monitors were set to record measurements of consecutive 5-minute L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels between 12:00 hours on Wednesday 17th April 2024 and 12:00 hours on Monday 22nd April 2024.
- 6.3 CSA is satisfied that the environmental noise survey data remain representative of the current noise climate.
- 6.4 The following equipment was used during the course of the survey:
 - 1 no. Rion sound level meter type NL53;
 - 1 no. Rion sound level meter type NL32;
 - 1 no. Convergence Instruments Noise Sentry;
 - 1 no. Rion sound level calibrator type NC74.
- 6.5 Additional detailed measurements were undertaken, as necessary, with the following equipment:
 - 1 no. Rion sound level meter type NL52;
 - 1 no. Norsonic sound level meter type 118;
 - 1 no. Rion sound level calibrator type NC74;
 - 1 no. Norsonic sound level calibrator type NOR1251.
- 6.6 The calibration of the sound level meters was verified before and after use. No significant calibration drift was detected.
- 6.7 Measurements were made following procedures in BS 7445:1991 (ISO1996-2:1987) *Description and measurement of environmental noise Part 2- Acquisition of data pertinent to land use* BS4142:2014+A.1:2019.
- 6.8 Historical weather data has been reviewed to confirm that the weather during the survey was generally dry with light wind, making the conditions suitable for the measurement of environmental noise.

6.9 CONTROL MEASUREMENTS

6.9.1 Upon retrieval of the monitoring equipment, on Monday 22nd April 2024, source noise measurements from the DM Chainsaws Ltd rear testing area were organised at around 11:00 with help from their staff. Noise measurements from machinery under test were undertaken directly adjacent to the source and also at positions representative of the nearest affected façades of the proposed development.

6.9.2 The following petrol/diesel machinery was tested in both idle conditions as well as under load:

- hedge cutter;
- trimmer;
- chainsaws (small/medium/large);
- angle grinder;
- lawnmower (Push/Ride-On);
- wood-chipper.

6.10 RESULTS

6.10.1 Figures AS11980/TH1-TH5 and TH6-TH10 show the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories over the survey period at measurement positions LT1 and LT2. Figures AS11980/TH11-TH15 show a comparison of the rolling $L_{Aeq,1hr}$ levels at the two monitoring positions as well as at the verification position, LT3. The rolling $L_{Aeq,1hr}$ noise levels are a logarithmic average of each set of 12 5-minute measurements. The $L_{Aeq,1hr}$ is beneficial for determining existing impact on nearby receptors when assessed in accordance with BS4142:2014+A.1:2019 *Methods for rating and assessing industrial and commercial sound*.

6.10.2 Following conversations with staff at DM Chainsaws Ltd, it is understood that the level of activity on Friday 19th April 2024 was particularly high, whilst that on Saturday 20th April 2024 was typical. It is also understood that the proposed site, used currently as an agricultural field, was ploughed on Friday 19th April, causing artificial elevation of noise levels, as visible in the appended time histories between 13:00 and 15:00 hours.

6.10.3 The L_{Aeq} and L_{A90} noise levels determined for the 'Daytime' and 'Night-time' periods are shown below, as well as the typical L_{AFmax} .

MEASUREMENT POSITION	DAYTIME 07:00 – 23:00		NIGHT-TIME 23:00 – 07:00		TYPICAL** NIGHT-TIME MAXIMUM NOISE LEVEL, L_{AFMax}
	L_{Aeq}	TYPICAL* L_{A90}	L_{Aeq}	TYPICAL* L_{A90}	
LT1	52 dB	31 dB	44 dB	21 dB	62 dB
LT2	50 dB	34 dB	48 dB	24 dB	67 dB
LT3 [^]	56 dB	N/A***	-	-	-

Table 6.1: Summary of measured noise levels at the monitoring positions.

[dB ref. 20 μ Pa]

[^]Monitor LT3 was positioned to determine sound contributions from use of the rear testing area of DM Chainsaws Ltd, which operates during the daytime only.

* Typical determined from 10th percentile of L_{A90} dataset

**Typical determined from 90th percentile of L_{Amax} dataset.

***Statistical parameters not available for this sound level meter.

6.10.4 The typical night-time maxima noise levels were found to be driven by early morning birdsong apparent between 05:00 and 07:00 hours. Occurrence of this source is seasonal; its contribution to the night-time average levels at LT2 being greater than those at LT1 is apparent only during late spring and summer months.

6.10.5 Figure 6.1 shows a frequency distribution plot of the background sound levels measured at position LT1 during the operational hours of DM Chainsaws Ltd.

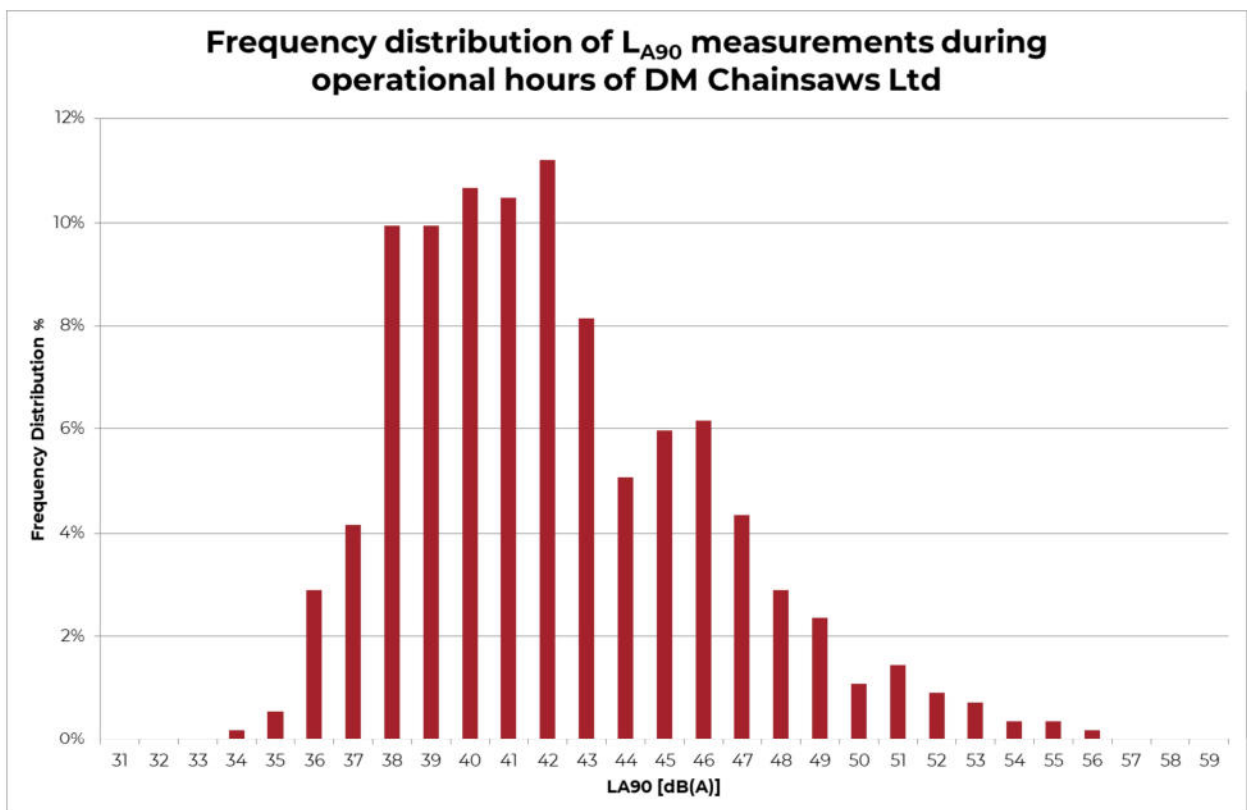


Figure 6.1: Frequency distribution plot of L_{A90} sound levels at position LT1 during operational hours.

7.0 CONDITION DISCHARGE

- 7.1 Following discussions with Mr David Denham, Environmental Health Officer at Arun District Council, it was agreed that a level of mitigation would be appropriate to maintain the aural amenity in the area.
- 7.2 It is no longer feasible to install a blockwork wall due to the following primary reasons:
- The adjacent underground pumping station, which requires a minimum clearance of 15 metres from structures as per the Sewers for Adoption guidance - the wall in its intended position would encroach on this clearance;
 - The foundation footprint of the blockwork wall would conflict with the planting within the buffer zone shown on the approved landscaping plans;
 - Existing ground conditions and associated settlement risk.
- 7.3 Instead, a 2-metre-high timber fence is, therefore, proposed along the boundary shared with DM Chainsaws Ltd to form an acoustic barrier.
- 7.4 The fence should achieve a minimum superficial mass of 15kg/m² and should ideally be formed of a tongue and groove panel construction with slotted profile posts to minimise risk of air gaps forming over time due to shrinkage.
- 7.5 As the barrier forms an essential part of the mitigation strategy, the longevity of the fence should be considered, with that selected targeting a minimum 15-year guarantee to demonstrate that it is suitably robust with respect to rot, insects, and adverse weather conditions. Following installation, it will be the responsibility of the developer to maintain the fence thereafter.
- 7.6 A 17dB correction for acoustic screening losses to the nearest affected dwelling due to the proposed fence has been determined against DM Chainsaw Ltd's testing location circa 0.5m to 1m from the fence, at a height of 1m. Where agreeable with DM Chainsaws, the testing area should be placed directly against the boundary fence to maximise acoustic screening losses to the development.
- 7.7 Whilst no additional attenuation has been applied in subsequent calculations, the proposed dwellings may also benefit from screening offered by the additional 1.8m close-boarded timber fence around private gardens providing a further buffer zone between the acoustic barrier and the rear boundaries of the nearest dwellings at Plots 1 to 7.

7.8 CONDITON 8

- 7.8.1 Condition 8 requires a noise impact assessment of the adjacent commercial noise source, DM Chainsaws Ltd, to demonstrate that an "*appropriate level of aural amenity*" can be maintained in habitable rooms and garden areas of the development, accounting for any relevant schemes of mitigation.
- 7.8.2 This assessment covers the rear testing area, considered the worst-case scenario. Testing activity within the central courtyard or adjacent to the car park has been considered. Activity in these areas present a less onerous scenario due to increased distance and screening propagation losses to the nearest proposed dwellings.

7.8.3 DM Chainsaws Ltd operates during the daytime hours only. Night-time periods are not, therefore, included in this analysis.

7.8.4 BS4142:2014+A.1:2019¹ describes a method for rating and assessing commercial sound which is summarised in Appendix B. Section 8.5 of BS4142:2014+A.1:2019 states that:

“Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation”

7.8.5 Due to the variability of specific sound sources, including the times at which they are tested, subsequent analysis has been undertaken using the rolling 1-hour $L_{Aeq,1hr}$ noise levels measured at position LT3, circa 8m from the testing area. This assessment is, therefore, reflective of typical test area activity, rather than estimations based upon source noise measurements of various equipment.

7.8.6 The rolling 1-hour $L_{Aeq,1hr}$ from DM Chainsaw Ltd testing activity calculated at monitoring position LT3 did not exceed $L_{Aeq,1hr}$ 63 dB. This excludes periods when the site was being ploughed by the landowner and CSA was undertaking control measurements.

7.8.7 Table 7.1 sets out this BS4142:2014+A.1:2019 analysis using a source level of $L_{Aeq,1hour}$ 63 dB measured at monitoring position LT3, and applying propagation and acoustic screening corrections where relevant:

BS4142:2014+A1:2019 Assessment Summary		
Receptor	Ground Floor Façade of Nearest Dwelling (Proposed – with mitigation)	Walberton Care Home (Existing)
Specific Sound Level	43 dB	41 dB
Total Acoustic Character Correction(s)	+3 dB (other sound characteristic)	+3 dB (other sound characteristic)
Rating Level ($L_{Ar,Tr}$)	46 dB	44 dB
Background Sound Level (L_{A90})	38 dB	38 dB
Assessment Level	+8 dB	+6 dB

Table 7.1 – BS4142:2014+A.1:2019 Assessment summary

[dB ref. 20µPa]

7.8.8 An assessment level of around +5 dB is likely to be an indication of an adverse impact, depending on the context, whereas an assessment level of around +10 dB is likely to be an indication of a significant adverse impact, depending on the context.

¹ BS4142:2014+A.1:2019 *Methods for rating and assessing industrial and commercial sound*

- 7.8.9 The assessment has shown that the resultant impact at the nearest proposed dwelling, using the highest measured $L_{Aeq1,hr}$ noise levels from activity at DM Chainsaw Ltd, would indicate a risk of adverse impact, depending on the context, but would sit below that which would indicate a significant adverse impact, depending on the context. Where this assessment used the highest measured $L_{Aeq1,hr}$ noise level across the measurement period, it could reasonably be expected that noise levels and the resultant impact would be lower at other times.
- 7.8.10 It should also be noted that the proposed boundary fence is capable of reducing typical commercial noise levels to levels commensurate with those currently experienced at Walberton Care Home, where it is understood that the care home has co-existed with DM Chainsaws Ltd for many years without complaint.
- 7.8.11 Further consideration has been given to noise levels from the commercial noise source to the gardens of the nearest affected dwellings. Based upon the monitoring data representative of typical activity, external noise levels from the commercial noise source will be controlled to below $L_{Aeq1,hour}$ 50 dB. The noise sources are inherently variable where elevated levels may be experienced for shorter periods of time throughout any one hour period. This could, however, be considered typical of most daytime soundscapes.

CONTEXT AND CONSTRAINTS

- 7.8.12 The context is an important aspect of any BS4142 assessment, where the following should be considered:
- The commercial sound sources will operate during daytime hours only, during a reduced period on Saturdays and not at all on Sundays or Bank Holidays.
 - The noise source does not operate continuously throughout the day, but periodically, as required.
 - Sound from the commercial premises generally comprises that from garden machinery such as hedge-cutters, lawnmowers and chainsaws. Much of the sound sources are therefore commonplace in an existing rural, agricultural and residential environment.
 - Occupiers of the nearest affected dwellings will be aware that they live in a property adjacent to a commercial noise source, where some level of noise would be anticipated.
 - Outline consent has been granted for residential development of the site; all practicable mitigation measures have been implemented in regard to site layout, building orientation and design.
 - The Walberton Care Home has co-existed without known complaints from the commercial noise source at levels commensurate with those anticipated at the proposed dwellings with the proposed mitigation measures.
- 7.8.13 As outlined in Section 7.8.4, BS4142 indicates that, in circumstances where new noise-sensitive receptors are introduced to existing commercial sound, other guidance and criteria may inform appropriateness. With the proposed mitigation measures in place, noise levels from commercial sources are expected to be controlled to internal and external noise levels otherwise considered appropriate for residential development, as discussed in further detail in Section 7.9 and Section 7.10.

- 7.8.14 It is noted that the site layout is required to follow the parameters plan approved at outline planning which sets out road positions and building frontages, as per Arun Local Plan Policy D DM1. Switching the buildings and gardens has been considered but would result in rear garden boundaries presenting onto roads which is not positively received and goes against the Arun District Council Design Guide and would result in access becoming contrived with additional hard surfacing required to facilitate access for fire / refuse vehicles.
- 7.8.15 Whilst sound from the commercial premises is expected to be audible throughout site, given the mitigation measures and additional context and constraints outlined above, an appropriate level of aural amenity is expected to be maintained internally and externally and Condition 8 satisfied.

Underground Pumping Station

- 7.8.16 Experience suggests that no appreciable noise impact should be expected from underground pumping plant. These installations are precision engineered for long-term permanent deployment beneath the ground and as such suitably contained to obviate concerns regarding noise pollution.
- 7.8.17 Guidance in relation to the location of pump stations relative to residential receptors is provided in the *Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England* (Version 2.1 May 2021) produced by Water UK.
- 7.8.18 The guidance provides details on the minimum distance between wet well pumping stations and habitable accommodation to minimise the risk of odour, noise and nuisance. Minimum separation distances for various pumping stations are provided in Table D.1 of this guidance, with the highest value for the minimum separation distance of 15 metres given for a Type 3 pumping station wet well and residential buildings which the guidance considers worst case in terms of buffer distances.
- 7.8.19 In comparison with this guidance, a separation distance of more than 30 metres is achieved to the closest noise-sensitive receptor (Plots 1-4) from the proposed underground pump station, enabling the engineers to specify any of the three types of pump designated therein.

7.9 CONDITION 12

- 7.9.1 As defined in Section 3.1, Condition 12 requires internal ambient noise levels within the dwellings of the proposed development to conform to those set out in Table 4 of BS8233:2014 *Guidance on sound insulation and noise reduction for buildings*. The targeted values are reproduced in Table 7.2 below.

ACTIVITY	LOCATION	07:00 – 23:00	23:00 – 07:00
Resting	Living Room	35 dB $L_{Aeq, 16hr}$	-
Dining	Dining room / area	40 dB $L_{Aeq, 16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16hr}$	30 dB $L_{Aeq, 8hr}$

Table 7.2: Summary of BS8233:2014 noise levels – Table 4.

[dB ref. 20µPa]

**NOTE 2 The levels shown in Table 4 are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in Table 4.*

***Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.*

****NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.*

- 7.9.2 The non-glazed elements of the dwellings will largely comprise of masonry. It is expected that these would be capable of achieving a minimum weighted sound reduction index of R_w 51dB, if tested in accordance with ISO 10140-2:2021 *Acoustics — Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation*.
- 7.9.3 The glazing and ventilation openings in the façade would, therefore, represent the acoustically weakest elements through which noise would be transmitted.
- 7.9.4 CSA has undertaken calculations of the internal ambient noise levels using the measured environmental noise levels from the monitoring positions.
- 7.9.5 Noise levels on site are generally sufficiently low that a passive ventilation strategy is suitable to maintain internal ambient noise levels. Windows may be openable out of personal preference, however, the whole dwelling ventilation strategy should rely on air bricks or trickle vents, as partially open windows could not be relied on to maintain internal ambient noise levels².
- 7.9.6 On the basis of the revised site and plot layouts and elevations, a glazing and ventilator specification has been determined to achieve the noise levels given in Table 7.3. The specification is determined from the 16-hour and 8-hour day and night-time average noise levels respectively, with further consideration to night-time maxima.

² Assuming 13dB loss for a partially open window as per research in NANRI16: 'Open/Closed Window Research – Sound insulation through ventilated domestic windows.

TYPE	WINDOW, MINIMUM SINGLE FIGURE WEIGHTED SOUND REDUCTION, R_w	VENTILATOR, WEIGHTED ELEMENT NORMALISED DIFFERENCE LEVEL, $D_{n,e,w}^*$
Type A	30 dB	30 dB
Type B	30 dB	N/A

Table 7.3: Minimum required sound reduction performances for specified glazing and ventilators

*Performance specification based upon a single vent per room

- 7.9.7 It should be noted that the alterations associated with the proposed scheme are sufficiently minor when compared to the consented scheme (Ref: WA/52/24/RES) such that these specifications have not changed.
- 7.9.8 The applicable façade locations of the Type A configuration are demarcated on appended site plan AS11980/SP1, where all remaining façades of the development should make use of the Type B configuration.
- 7.9.9 It should be noted that any quoted sound reduction performance(s) provided by a glazing supplier or manufacturer are met by the whole system, i.e. inclusive of frames and seals. Glazing performance alone is not an acceptable means of demonstrating compliance with the specification for window performance.
- 7.9.10 Ventilator performance specifications are determined on the basis of a single vent per room. Where the level of ventilation required necessitates additional vents, the performance requirement shown will be increased by a value equal to $+10\log(N)$, with N being the total number of vents serving the room. [i.e. if two vents are required: $+10\log(2) = +3\text{dB}$, the individual specification being $D_{n,e,w} 33\text{dB}$.]
- 7.9.11 The specifications shown in Table 7.3 are not onerous and can generally be achieved through standard thermal double glazed window systems and lower grade acoustic ventilators.
- 7.9.12 Where the specifications given in Table 7.3 are realised, the internal ambient noise levels set out in Table 4 of BS 8233:2014 are expected to be maintained in all dwellings, including those overlooking the commercial noise source.

7.10 CONDITION 13

- 7.10.1 As per guidance set out in Section 7.7.3.2 of BS 8233:2014, noise levels for external amenity spaces should ideally not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$. The value of T is typically taken as the daytime, i.e. 16h. Condition 13 requires the upper guideline value not to be exceeded within external amenity spaces throughout the development.
- 7.10.2 Noise levels in external amenity areas are largely determined by contributions from Yapton Lane and the adjacent commercial premises. Anticipated external noise levels will, therefore, vary throughout the site, subject to proximity to these sources.

- 7.10.3 As shown in Table 6.1, measured daytime noise levels at Positions LT1 and LT2 are seen to lie below the upper guideline value.
- 7.10.4 Further consideration is given to dwellings close to the commercial premises. As shown in Table 7.1, noise emissions from the commercial noise source over a one-hour period are expected to be controlled by the proposed boundary wall to levels below the lower guideline value in the gardens of the nearest affected residences. Resultant noise levels at all locations from the commercial activity would be lower still when considering the full 16-hour daytime period.
- 7.10.5 Provided that the proposed acoustic screening is realised on the boundary shared with the adjacent commercial premises, this condition is expected to be satisfied.

8.0 UNCERTAINTY

- 8.1 As per the requirements of BS4142:2014+A1:2019, the uncertainty in the assessment is considered and reported. This is not an indication of error, but an acknowledgement of possible variability of the factors contributing to the assessment.
- 8.2 Use of a calibrated type 1 sound level meter reduces measurement instrumentation error to insignificant levels as compared to environmental variations.
- 8.3 The BS4142:2014+A1:2019 assessment has been undertaken using data captured across multiple days in which DM Chainsaws Ltd was operational. Associated uncertainty with respect to typical noise emissions and operational times are therefore reduced, with the highest $L_{Aeq,1hr}$ noise level used to provide a robust assessment.
- 8.4 It has not been necessary to rely on manufacturer's given noise data for equipment associated with DM Chainsaws Ltd, where the data used is fully representative of noise levels associated with equipment supplied by their customers for repair.

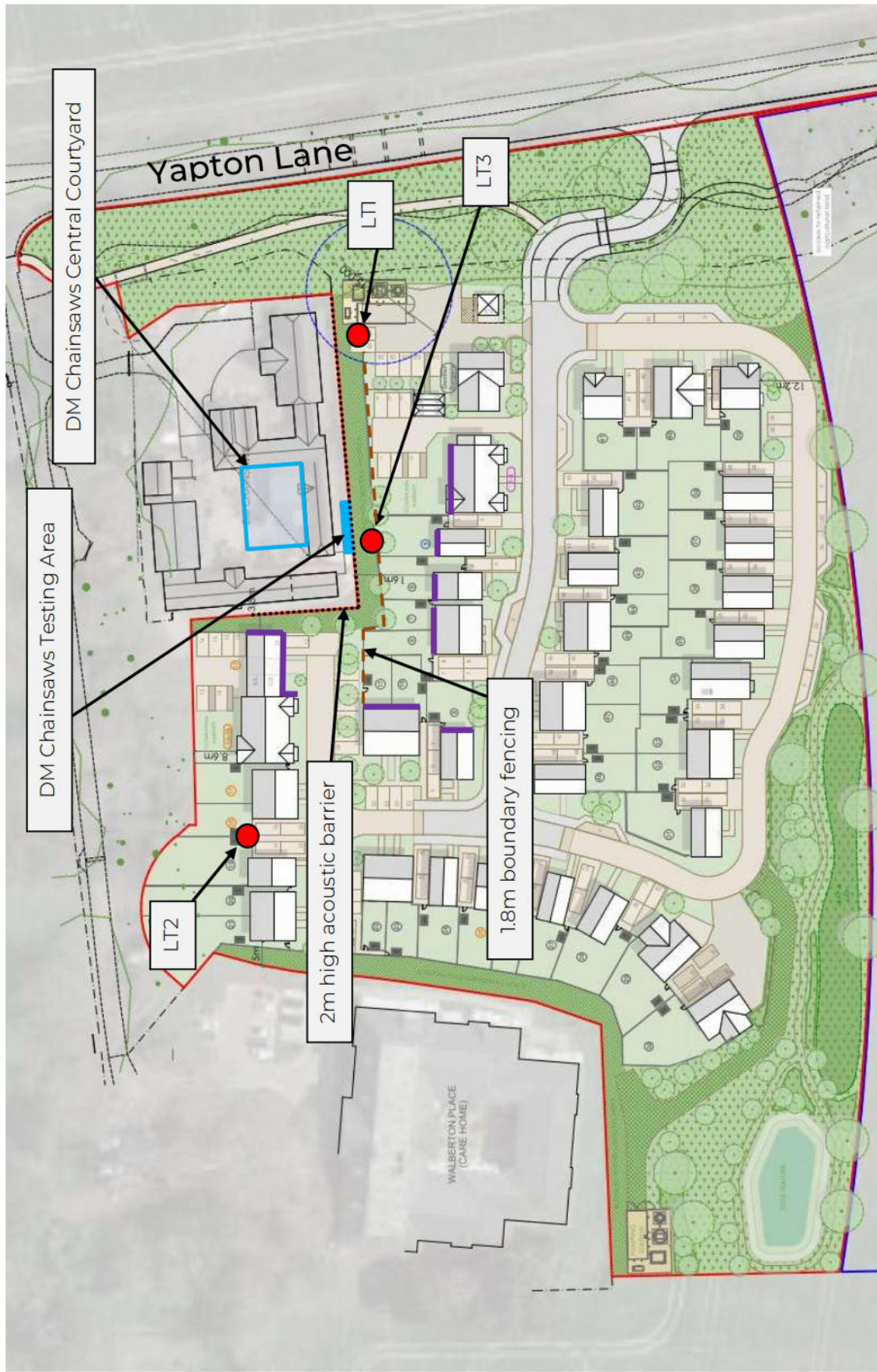
9.0 CONCLUSION

- 9.1 Outline planning permission was granted for residential development and a dental surgery at Land West of Yapton Lane, Walberton, subject to three planning conditions intended to protect future residents from noise associated with the adjacent commercial premise. These conditions remain outstanding, however no further objective from Environmental Health was provided in the Reserved Matters application (WA/52/24/RES) based on technical information contained in CSA's Noise Impact Assessment (ASI1980.240426.NIA.1.0).
- 9.2 Doswell Homes are proposing a revised scheme as part of a NMA application, which differs marginally from the consented scheme. The principal changes comprise amendments to plot layouts, the omission of garages and replacement of the previously proposed masonry boundary wall with a timber barrier due to constraints with the foundations.
- 9.3 CSA has reviewed the revised plot layouts and confirmed that the previously established façade specifications remain appropriate for the new proposal with respect to maintaining internal ambient noise targets from BS 8233:2014.
- 9.4 A 2m high timber acoustic barrier, constructed to the specification outlined in this report, is expected to provide acoustic screening sufficient to control noise from DM Chainsaws Ltd to a level comparable with that experienced at existing nearby receptors. As a result, external amenity areas are also expected to satisfy the requirements of Condition 13.
- 9.5 Having reviewed the revised development proposals, CSA is satisfied that the conclusions of the previously approved noise impact assessment remain unchanged. Subject to implementation of the mitigation measures identified within this report, an appropriate level of residential amenity can be achieved and the requirements of Conditions 8, 12 and 13 are expected to be satisfied.

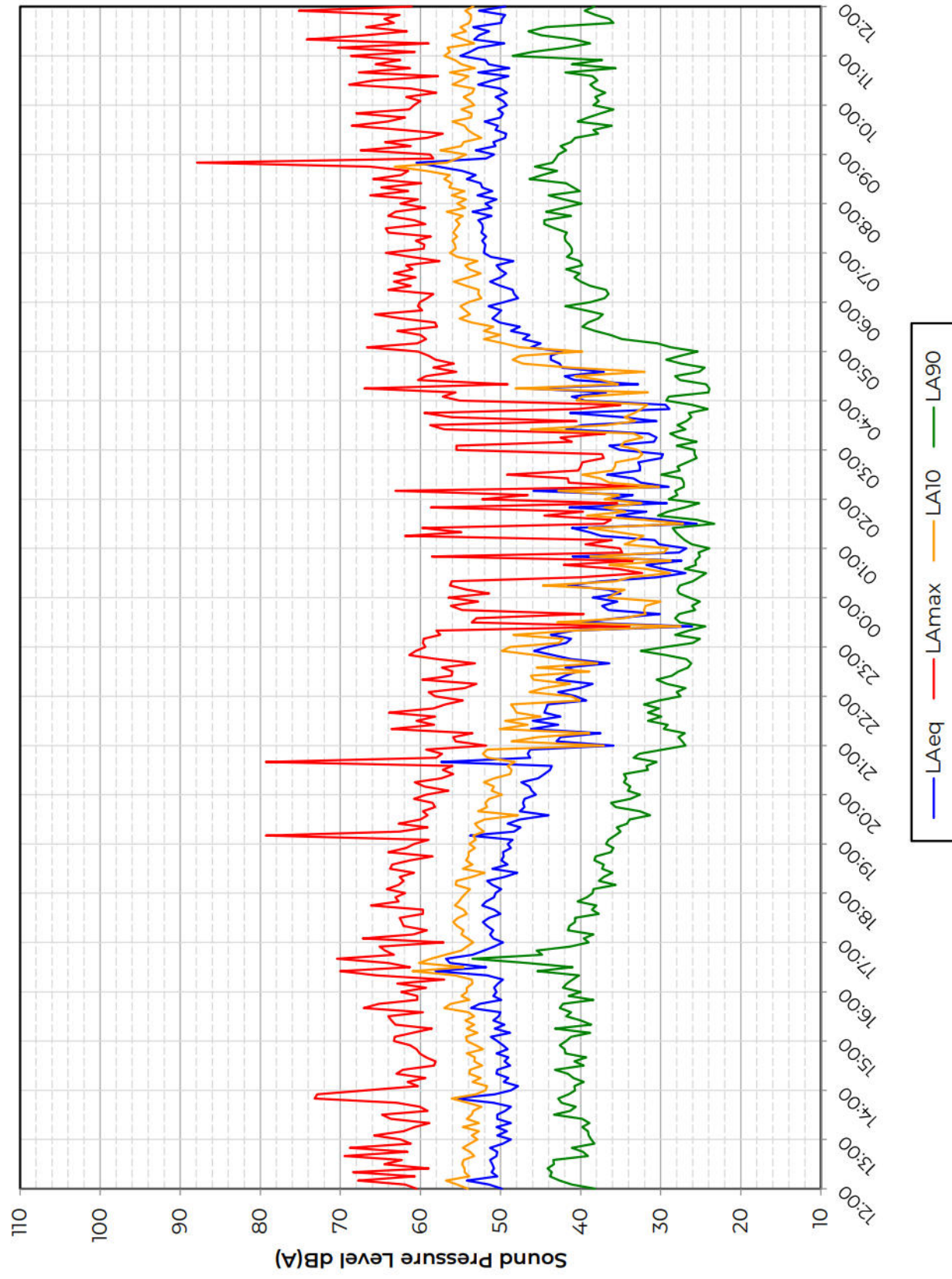
pp.



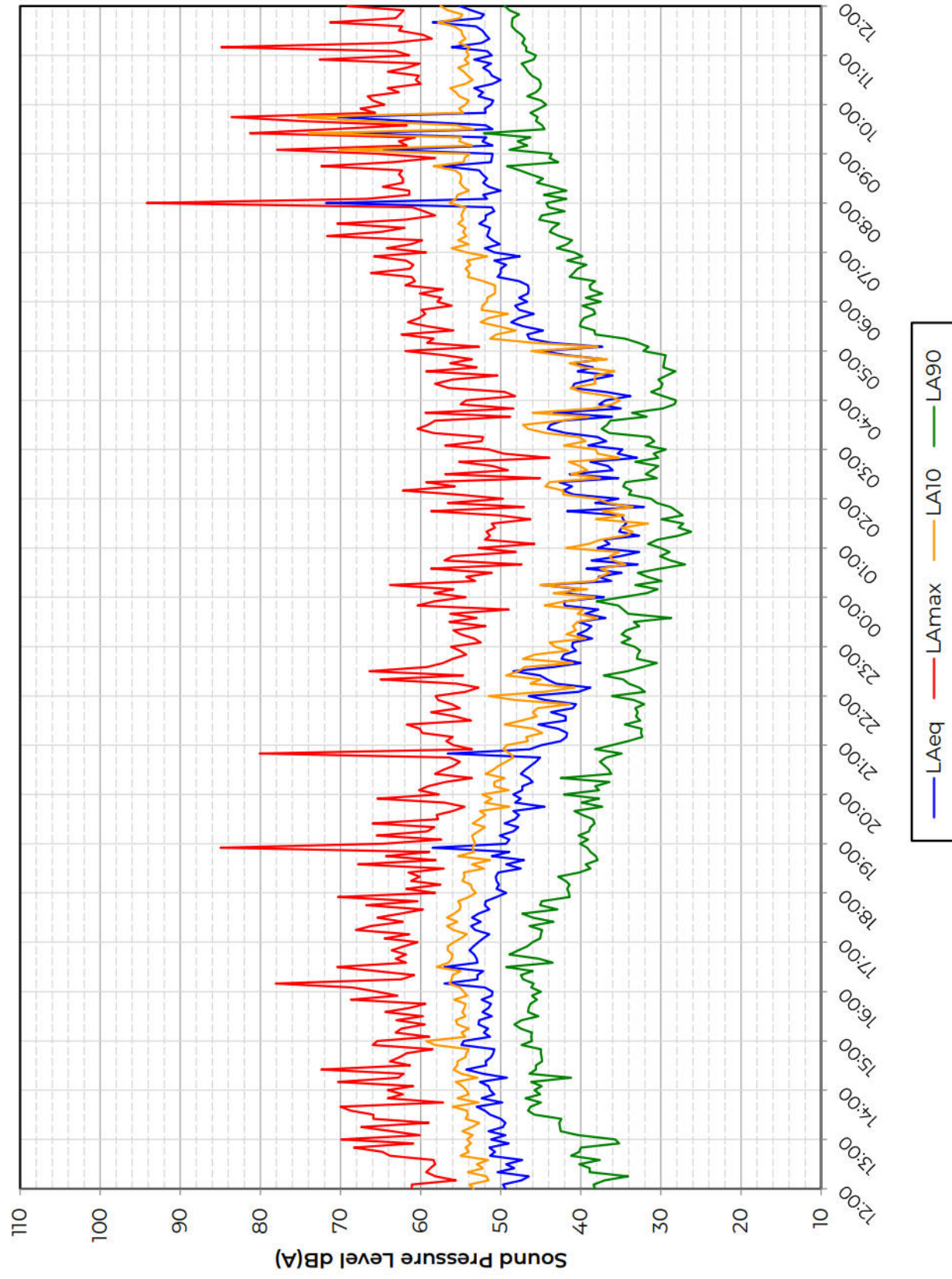
Andrew Nesbitt MIOA
CLARKE SAUNDERS ACOUSTICS



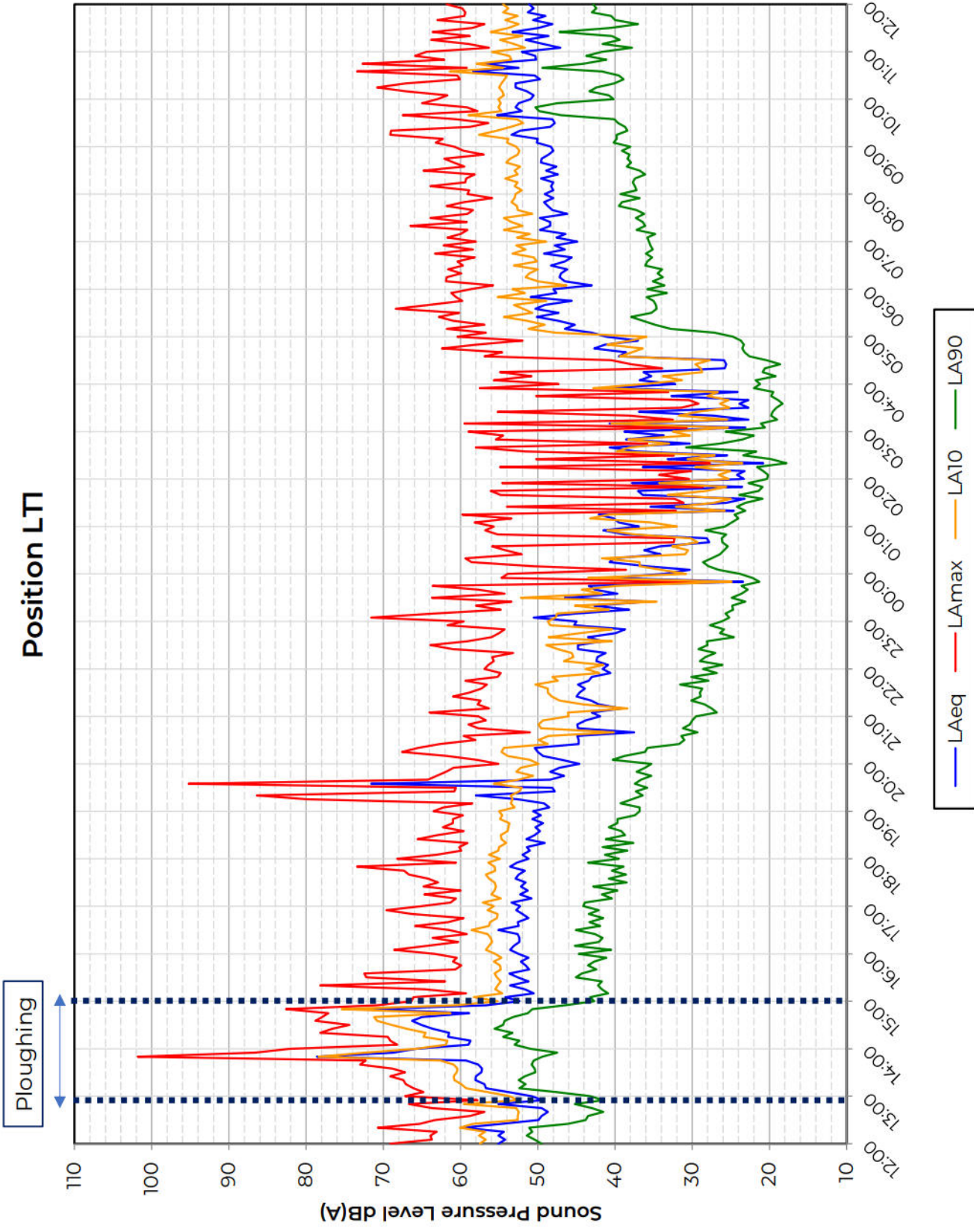
Position LT1



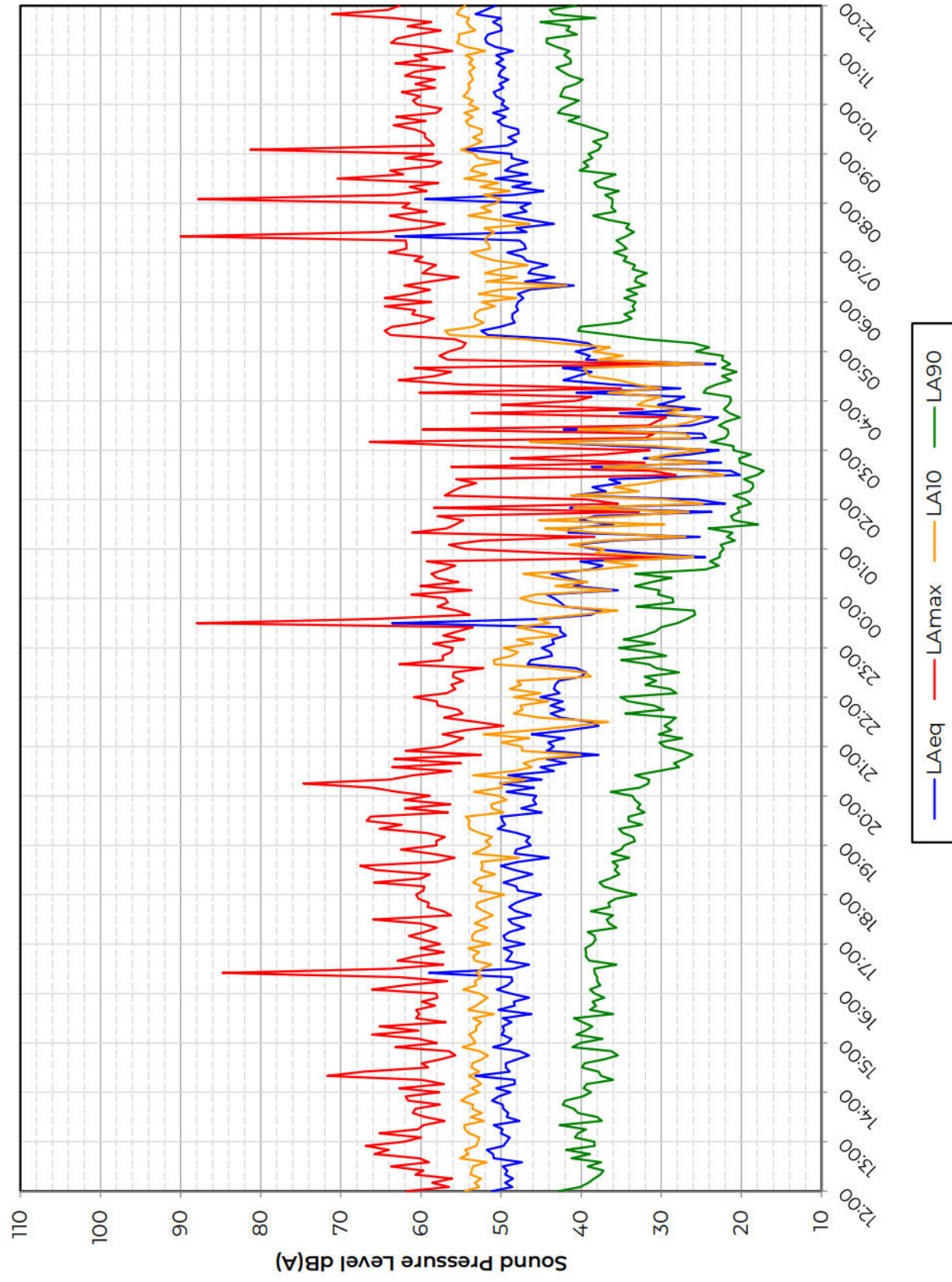
Position LT1



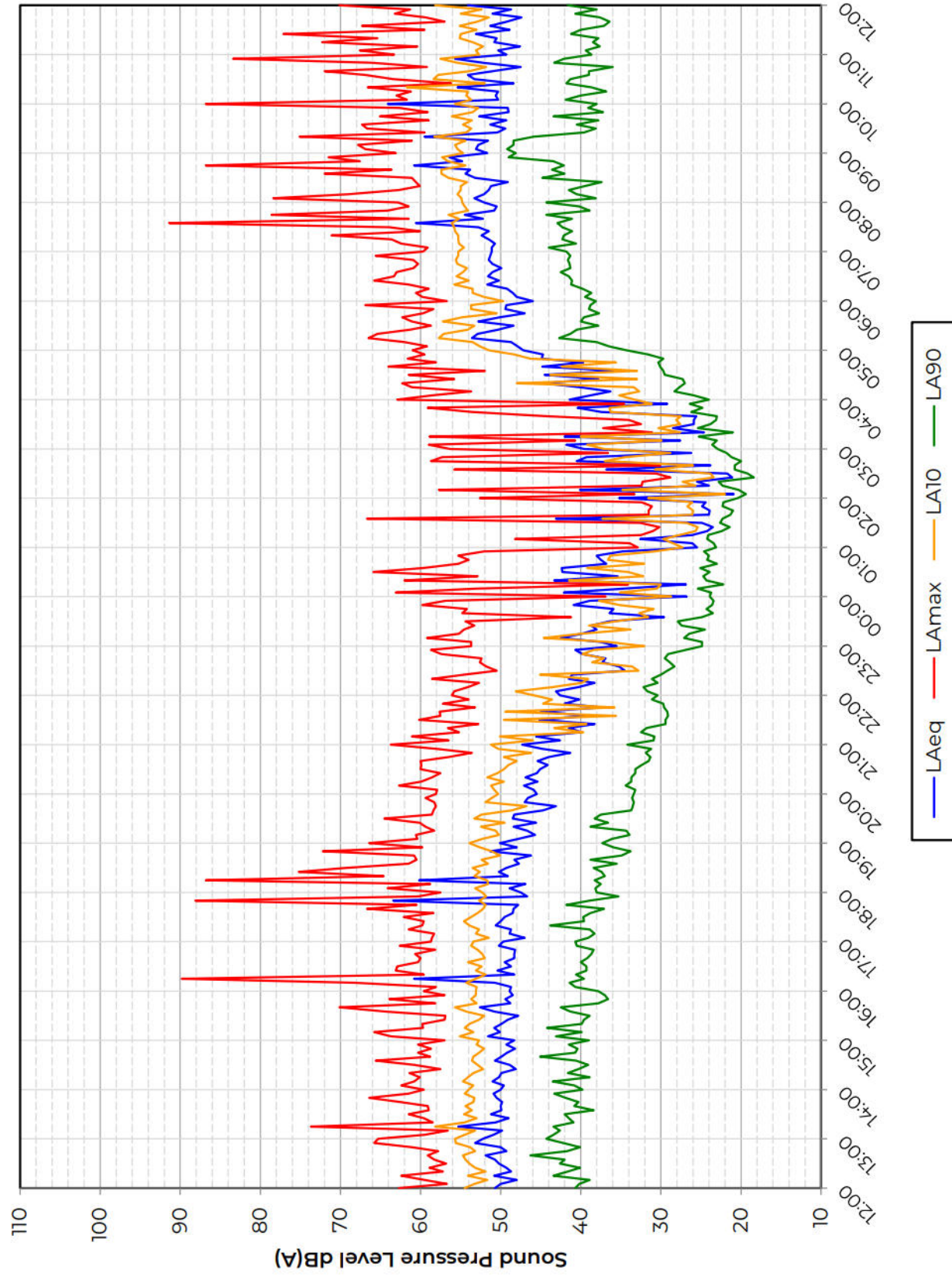
Yapton Lane, Walberton



Position LT1

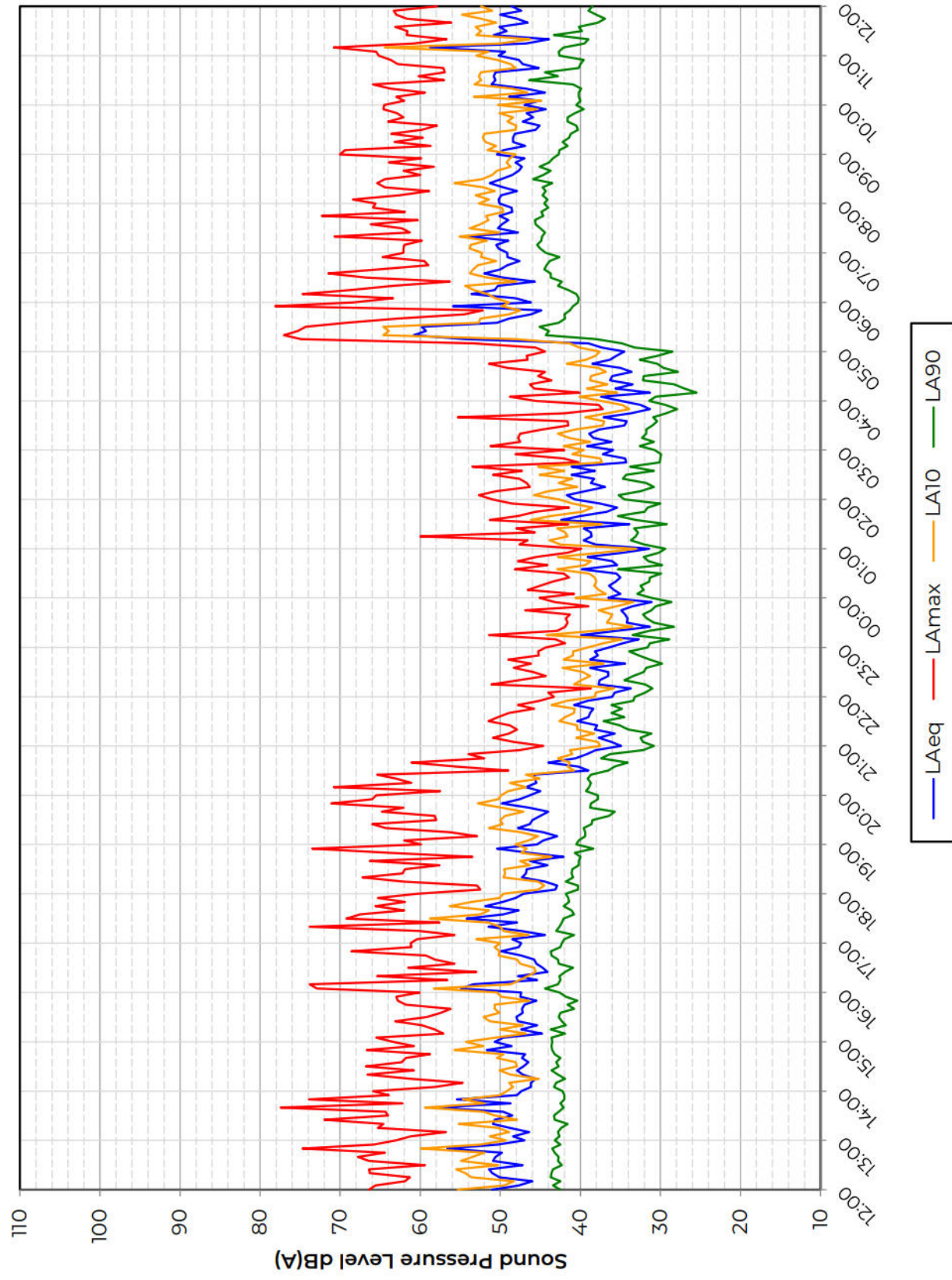


Position LT1

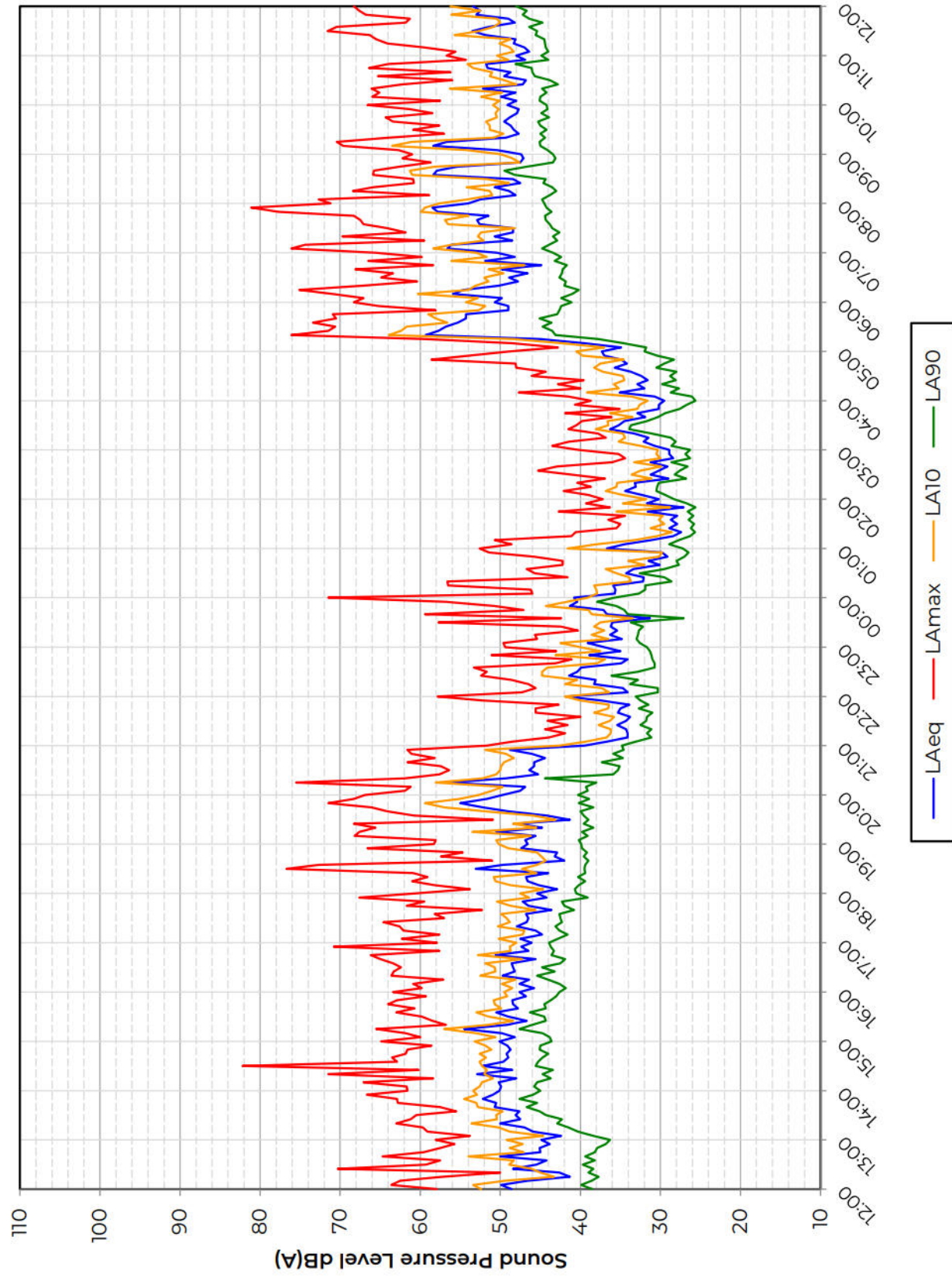


Yapton Lane, Walberton

Position LT2

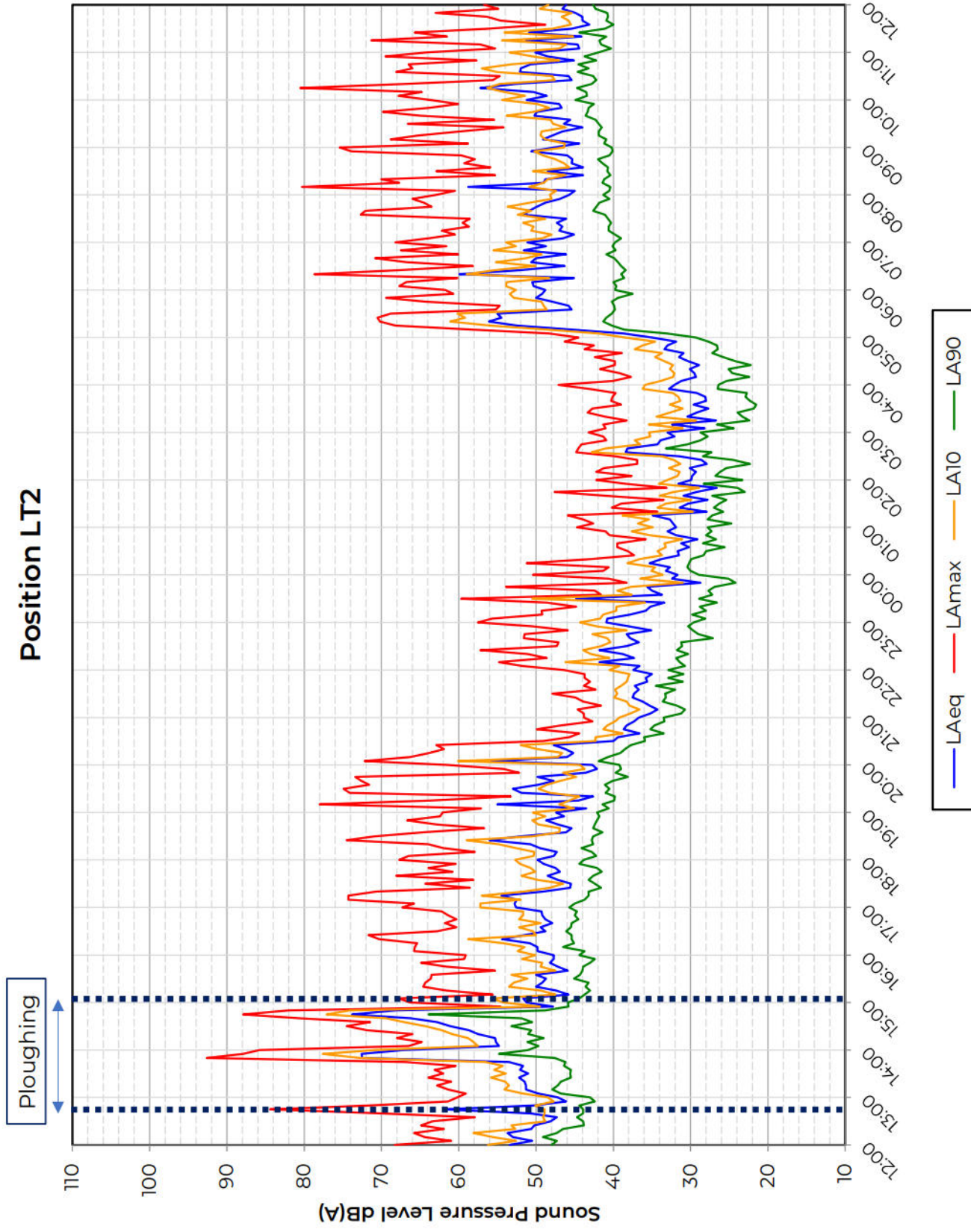


Position LT2

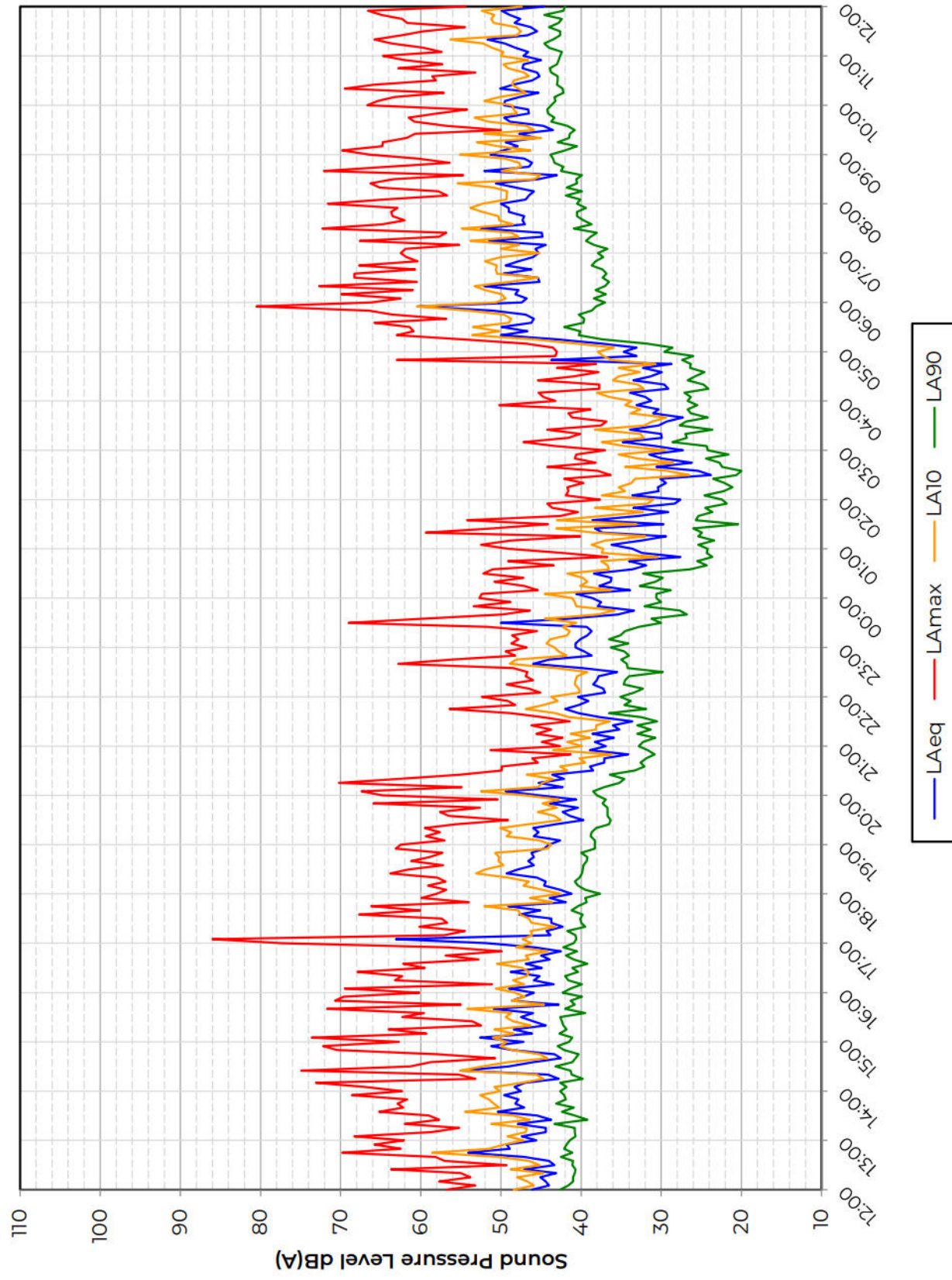


Yapton Lane, Walberton

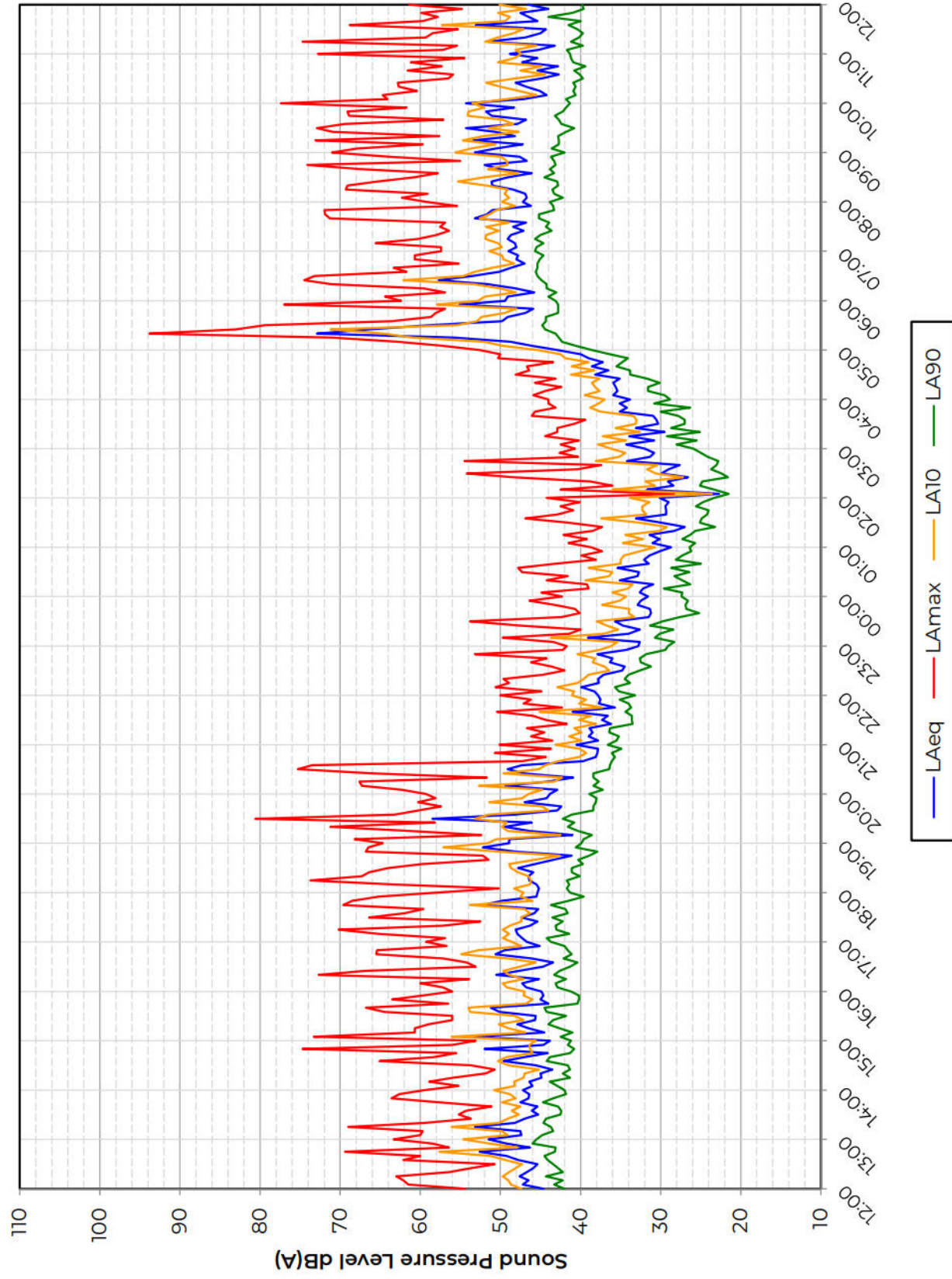
Position LT2



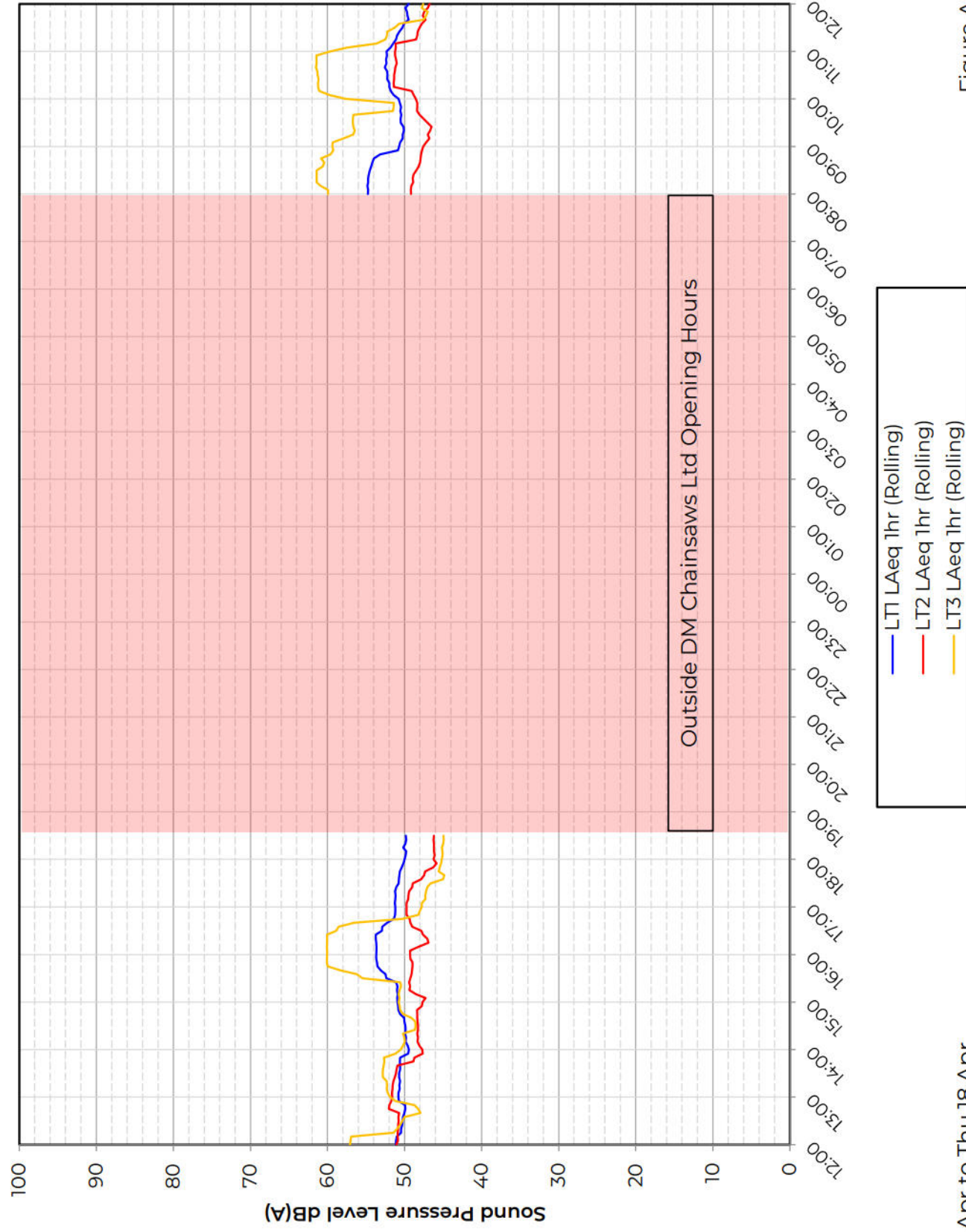
Position LT2



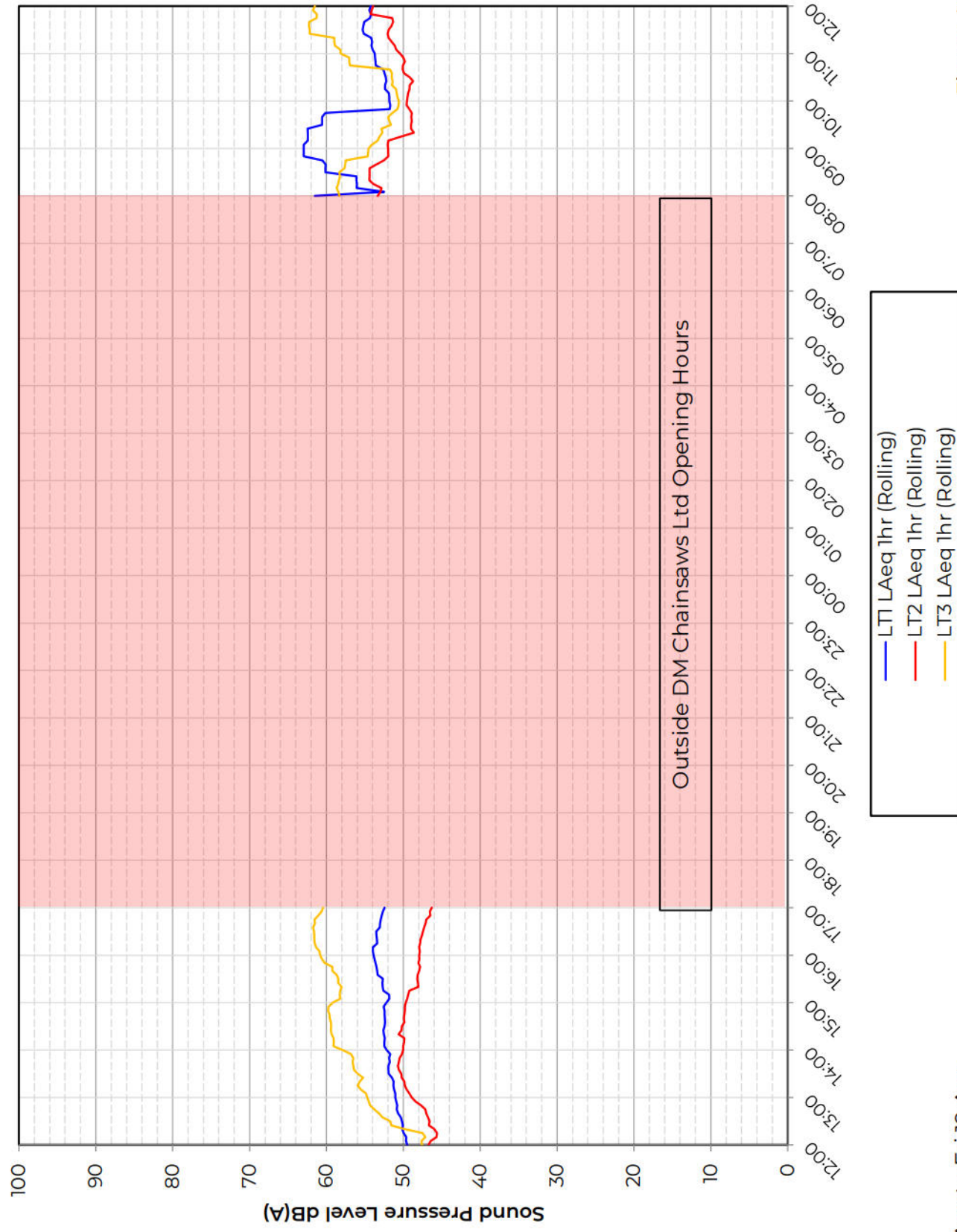
Position LT2



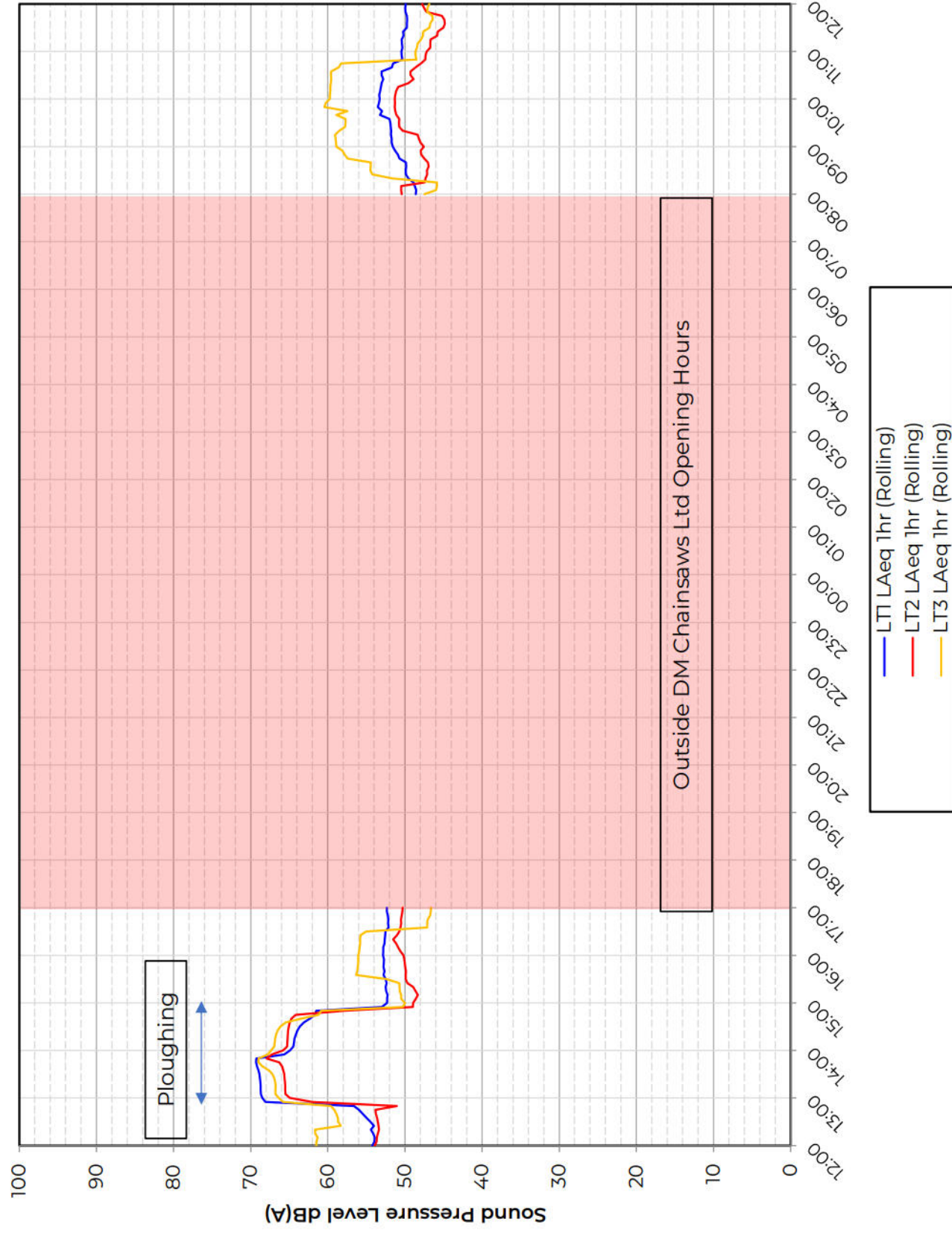
Rolling LAeq,1hr Comparison (Operational Hours)



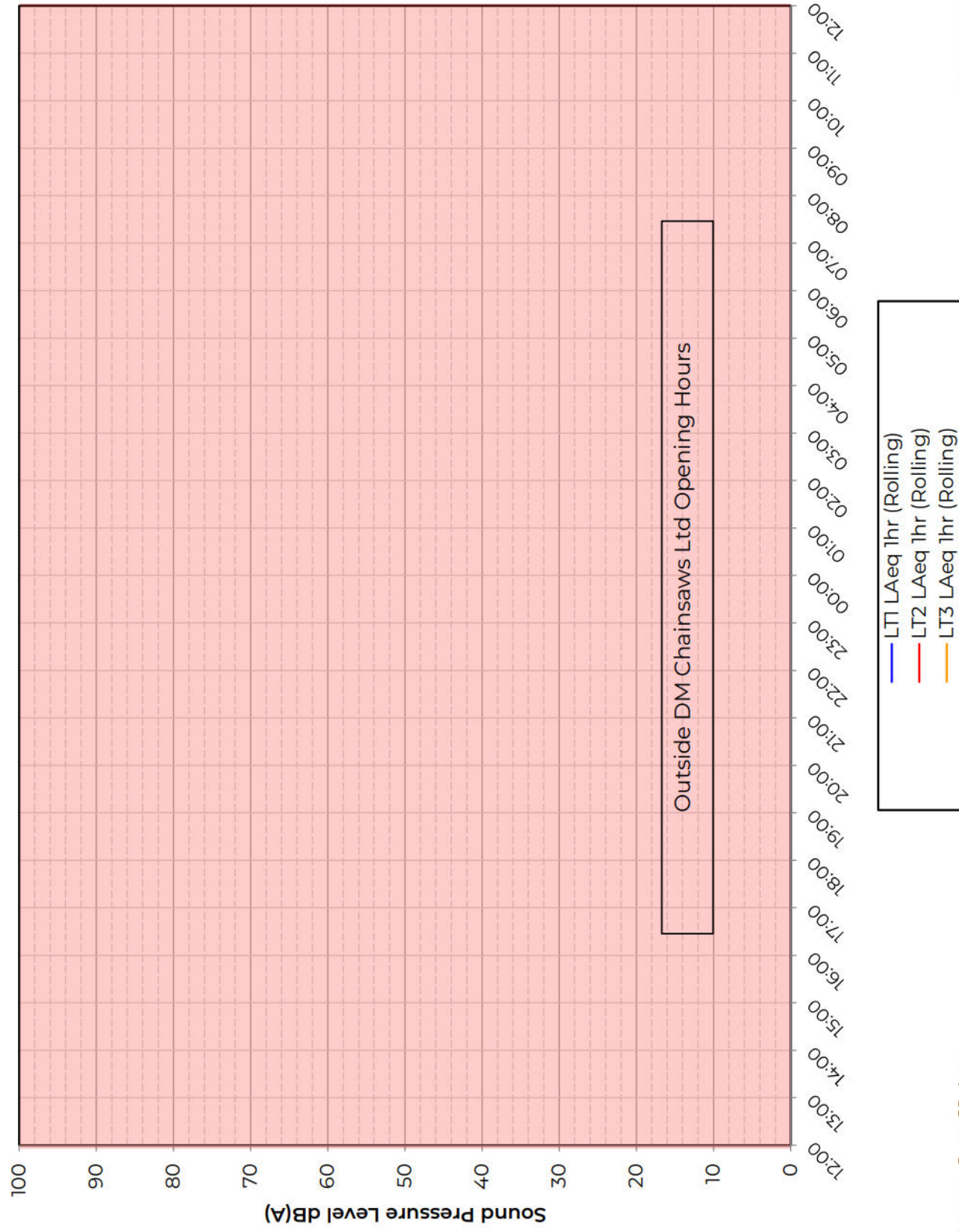
Rolling LAeq,1hr Comparison (Operational Hours)



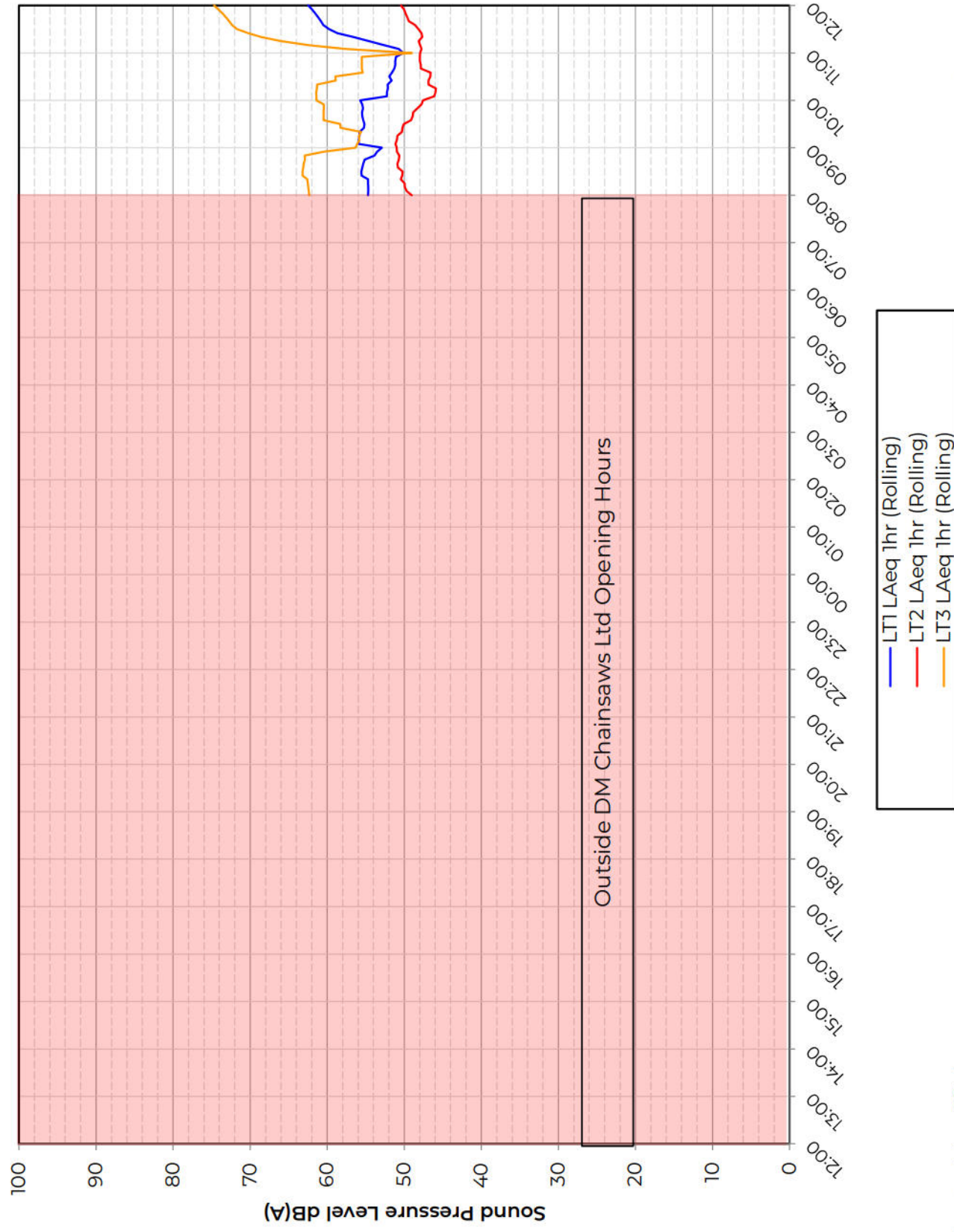
Rolling LAeq,1hr Comparison (Operational Hours)



Rolling LAeq,1hr Comparison (Operational Hours)



Rolling LAeq,1hr Comparison (Operational Hours)



Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A .
L_{eq}:	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90}:	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max}:	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.
NR	<i>Noise Rating</i> . A single figure noise level rating that takes into account the frequency content of an acoustic environment.
R	<i>Sound Reduction Index</i> . Effectively the Level Difference of a building element when measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010 and corrected for its size and the reverberant characteristics of the receive room.
D	The sound insulation performance of a construction is described in terms of the difference in sound level on either side of the construction in the presence of a sound source on one side and the reverberant characteristics of the adjoining 'receive' space. D is the arithmetic Level Difference in decibels between the

source and receive sound levels when filtered into frequency bands.

D_{nT}	<i>Weighted Standardised Level Difference.</i> As defined in BS EN ISO 717-1, representing the Weighted Level Difference, when standardised for reference receiving room reverberant characteristics.
$D_{n,e}$	Normalised sound insulation of small building elements of fixed dimensions, such as vents, measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-2:2010.
$D_{n,f}$	Flanking sound insulation of lightweight elements, such as curtain wall mullions, measured in an accredited laboratory test suite in accordance with the procedures laid down in ISO 10848-2:2006
$R_w D_w$ $D_{nT,w} D_{n,e,w}$ $D_{n,f,w}$	Value of parameter, determined as above, but weighted in accordance with the procedures laid down in BS EN ISO 717-1 to provide a single-figure value.
C, C_{tr}	Spectral adaptation terms to be added to a single number quantity such as $D_{nT,w}$, to take account of the sound insulation within frequency ranges of particular interest.
$L'_{nT,w}$	<i>Weighted Standardised Impact Sound Pressure Level</i> as defined in BS EN ISO 717-2, representing the level of sound pressure when measured within a space where the floor above is under excitation from a calibrated tapping machine, standardised for the receiving room reverberant characteristics.
ΔL_w	Change in impact sound pressure level when a floor is fitted with a 'soft' or resilient covering, as measured in an accredited laboratory test suite in accordance with the procedures laid down in BS EN ISO 10140-3:2010.

Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band.

In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000
------------------------------------	----	-----	-----	-----	------	------	------	------

Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a

APPENDIX A

ACOUSTIC TERMINOLOGY AND HUMAN RESPONSE TO BROADBAND SOUND

guide to the subjective interpretation of changes in environmental sound level can be given.

INTERPRETATION

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.

BS4142 is designed to allow contextual assessment of impact from commercial, or industrial sound on sensitive receptors. Examples covered by the Standard include:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

In brief, the assessment procedure involves establishing sound levels from the items or processes of interest, (the specific sound source(s)), corrected for any acoustic features to derive the Rating Level, (L_{Ar,T_r}), at the relevant assessment position(s). The Rating Level is compared against the existing Background Sound Level, ($L_{A90,T}$), to provide an initial estimate of impact. The Standard offers the following guidance with regard to the significance of estimated impact:

- a) Typically, the greater this difference, the greater the magnitude of the impact;*
- b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- c) A difference of around +5dB could be an indication of an adverse impact, depending on the context;*
- d) Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context. The lower the rating level is relative to the background sound level, the less likely it is that the specific sound source will have an adverse impact.*

Where relevant, the initial estimate should then be modified by accounting for contextual aspects of the operation of the specific sound source and / or the context of the character of the area.

Other Assessment Parameters and Guidance on Character Corrections

The Specific Sound Level (L_s) is expressed in terms of an L_{Aeq} for a reference time interval, (T_r) of one-hour during the daytime (07:00 – 23:00 hours) and a fifteen-minute period during the night-time (23:00 – 07:00 hours). The Rating Level is also expressed in terms of the reference time interval, T_r .

The Specific Sound Level can be determined by various means, which can include prediction based on manufacturer's data and accompanying propagation calculations to the assessment position(s). This method could be used, for instance, where the specific sound source is not yet in-situ, or is in-situ but not yet operational.

Where the specific sound source is already operational and in-situ, measurements of the sound climate resulting from both the specific sound source and all other contributing sources, (known as the Ambient Sound Level, $L_a = L_{Aeq,T}$) should be measured over a representative time period, ideally at the assessment position(s).

Depending on the relative contribution of other sources not related to the specific sound, (known as the residual sound), the Specific Sound Level can be derived by logarithmically subtracting the Residual Sound Level, $L_r = L_{Aeq,T_r}$ from the Ambient Sound Level.

With justification, representative proxy locations can be used for the measurement of the ambient and/or residual sound climate. Where these measurement locations are not fully representative of the assessment position(s), measurement can be supplemented with calculation.

The Background Sound Level should ideally also be measured at the assessment position(s) but can be measured at representative proxy locations where suitable reasons can be provided. The Background Sound Level should be measured over a period which is suitable to characterise the background sound climate during the period of interest and should normally be at least 15 minutes.

When deriving the Rating Level from the Specific Sound Level, consideration is given to the character of the sound. The Standard provides several methods for deriving appropriate character corrections, offering the following advice for subjective assessment:

Tonality

For sound ranging from not tonal to prominently tonal, the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be allocated as a penalty of 2 dB for a tone which is just perceptible at the sound receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9dB can be applied for sound that is highly impulsive considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be allocated as a penalty of 3dB for impulsivity which is just perceptible at the receiver, 6dB where it is clearly perceptible and 9dB where it is highly perceptible.

Other sound characteristics

Where the specific sound contains characteristics that are neither tonal nor impulsive, but are otherwise startling, disturbing or incongruous with the residual acoustic environment, a penalty of +3dB can be applied.

Intermittency

When the specific sound has identifiable on/off conditions, if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3dB can be applied.