

PREPARED: 11 December 2025

Newquay HWRC and Reuse Shop, Newquay Sound Impact Assessment

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APPENDIX A	Acoustic Terminology

Project Ref:	ASI3674	Project Name:	Newquay HWRC and Reuse Shop
Report Ref:	ASI3674.250516.NIA.V1.7.docx	Report Title:	Sound Impact Assessment
Client Name:	SUEZ Recycling and Recovery UK Ltd		
Project Manager:	Mike McLoughlin		
Report Author:	Mike McLoughlin		
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 This noise assessment accompanies the Mitigation Checklist submission for the Household Waste Recycling Centre (HWRC) and / Re-Use Centre/Shop within the Hendra area of the Nansledan Local Development Order (LDO) site. The development is approved as part of the 2021 Nansledan LDO.
- 1.2 Environmental sound levels have been measured at key surrounding noise-sensitive receptors to determine typical ambient and background sound levels.
- 1.3 Additional noise measurements have been conducted at a similar HWRC located in Truro to determine representative noise emissions from the proposed HWRC site.
- 1.4 Predicted sound levels of the proposed development operations have been calculated at the locations of the nearest noise-sensitive receptors.
- 1.5 An assessment has been conducted to the requirements of the LDO, Cornwall Council Development Sound Standard (DSS), and British Standard 4142:2014 + A.1:2019 Methods for rating and assessing industrial and commercial sound has been conducted to determine the potential impact of the development on surrounding noise-sensitive receptors.
- 1.6 With consideration of the predicted Specific Sound Level and context of the existing ambient sound at the receptors, the assessment concludes that the residual noise impacts during the operation of the proposed development would be low.
- 1.7 Given appropriate conditioning of a planning consent, adverse noise impacts at surrounding existing noise-sensitive receptors due to the proposed development operation are not expected.

2.0 INTRODUCTION

- 2.1 Clarke Saunders Acoustics has been commissioned by SUEZ Recycling and Recovery UK Ltd to undertake a sound impact assessment for the approved Household Waste Recycling Centre (HWRC) and / Re-Use Centre/Shop located in the Hendra area of the Nansledan LDO site.
- 2.2 This report has been prepared as part of the Mitigation Checklist submission for the approved development, and details baseline sound measurements at surrounding noise-sensitive receptors and sound emissions criteria.
- 2.3 Noise is considered in accordance with the LDO, Cornwall Council Development Sound Standard (DSS), and *BS4142:2014 + A1:2019 The Standard for Methods for rating and assessing industrial and commercial sound*.
- 2.4 Please see Appendix A for a glossary of acoustic terminology used in this report.

2.5 SITE DESCRIPTION AND PROPOSALS

- 2.5.1 The site is located within the Hendra area of the approved Nansledan LDO site located to the southeast of Newquay town centre. This area has approval for a maximum of 16,800 sqms of GIA (employment generating floorspace in Use Classes B, C, E and F) and 135 homes, a Household Waste Recycling Centre. Rail Holt and Park and Ride. At present,

the site is a vacant plot within an area of open fields with existing residential properties located to the west.

- 2.5.2 The existing local soundscape at the nearest noise sensitive receptors is predominantly determined by road traffic noise from local roads, it is noted that the Newquay Strategic Route (NSR) was not in operation at the time of the survey.
- 2.5.3 The proposed development site and surrounding noise-sensitive receptors are shown in the attached Figure AS13674/SP1.
- 2.5.4 The HWRC will be a split-level facility with a one-way system for residents accessing the site to deposit waste. The HWRC will be located on the southern section of the site footprint.
- 2.5.5 The Re-Use Centre/Shop will be located directly to the north of the HWRC and is ancillary to the HWRC development as the facility will predominantly receive items that have been taken to the adjacent Newquay HWRC for recycling, but which are still in good condition and can be collected, sorted, cleaned, repaired, upcycled, and sold.
- 2.5.6 The proposed operating hours of the development are;
- Reuse shop: 09:00 – 16:00 seven days a week including all bank/public holidays excluding Christmas Day, Boxing Day and New Years Day with the potential to extend into evenings up until 21:30 for repair classes/workshops with a small number of attendees.
 - HWRC – operational 07:00 to 17:00 for vehicles and staff, open for the public 09:00 – 16:00 seven days a week including all bank/public holidays excluding Christmas Day, Boxing Day and New Years Day.
- 2.5.7 One to two personnel are expected to work in the Re-Use Centre/Shop, and six personnel for the HWRC.
- 2.5.8 HWRC operational traffic movements are expected between 07:00 to 17:00 for HGV vehicles and staff, with circa 6 – 8 HGVs a day. It is likely that approximately 67% of HGV vehicles would arrive prior to public opening (between 07:00 and 09:00) with the remaining at intervals throughout the day. There could be up to eight bin exchanges between 07:00 and 09:00 but a more typical day would see three to four changes.
- 2.5.9 HWRC traffic movements from members of the public at the current Newquay HWRC on Trevenson Road, ranges between 450 visits per day in winter and 750 visits per day in summer based on ANPR data. This use profile has been applied to the proposed site.
- 2.5.10 At the Trevenson Road HWRC there is a booking system in place which will be replicated at the proposed site restricting total visitors and vehicles spreading visits more evenly across the day.
- 2.5.11 Traffic movements to the Reuse shop will likely to be limited, with estimates of 20 private vehicles accessing per an hour, the majority of which will come from the HWRC following deposit of waste items.
- 2.5.12 Compaction of waste bins will occur on the site throughout the day depending on need and could start from 07:00.

- 2.5.13 Bottle banks are proposed on the upper level to the south of the site, these will be likely to be exchanged prior to public opening (07:00 - 09:00) due to reduced capacity relative to other waste streams.
- 2.5.14 It is envisaged that the HWRC will be constructed first with the Re-Use Centre/Shop constructed as a second phase. During this interim period, the HWRC will sell items brought to the site from an area on the southern boundary of the site where a number of ISO containers will be set up next to the welfare cabin. The sales area within the HWRC will not require any additional staff and is limited in area so will not require additional parking as it is not envisioned that visitors will spend a significant amount of time within the area.
- 2.5.15 The Hendra area of the Nansledan LDO is being developed to include a mixture of commercial / industrial uses and residential development. Figure AS13674/SP1 provides details of the illustrative masterplan of this area. Residential development is indicated to the west of the Newquay Strategic Route (NSR), with potential for commercial / industrial uses and residential to the south of the NSR.
- 2.5.16 As part of the proposals, a 2.1m high fence is to be located on the western boundary of the site, at the top of the earth cutting. This fence should be constructed to have no gaps and have a minimum surface mass of 12 kg/m².
- 2.5.17 The layout of the proposed development and location of the boundary fence is shown in Figure AS13674/SP3.
- 2.5.18 It is noted that ambient and background noise level in the Hendra area of the LDO will increase as a result of the NSR becoming operational.
- 2.5.19 As there is a possibility that residential development could occur on the land between the commercial area to the south of the HWRC and the A392, this area will benefit from noise screening provided by the commercial units. These units are expected to reach 6 metres in height at the ridge. As the LDO allows a flexible development process, if the residential units are built before the commercial units, a 2-metre-high bund topped with a 2-metre acoustic fence constructed on the land directly south of the HWRC, (where the commercial units will eventually be located) would provide alternate suitable noise mitigation for appropriate control of road traffic noise. This bund and fence will need to remain in place until the commercial units are constructed.
- 2.5.20 Because the bund will be located outside of the red line boundary for the HWRC mitigation checklist, its construction will need to be managed by a third party—likely the Duchy or the developer building the residential properties. The bund would only be required if the residential development is completed before the commercial units, so it will not form part of the HWRC works.

2.6 COMPETENCE

- 2.6.1 Senior CSA Acoustic Consultant, Mike McLoughlin, conducted the sound survey and assessment. He has over 20 years' experience of acoustic consulting, holding a BSc (Hons) and MSc in acoustic studies. He is a Corporate Member of the Institute of Acoustics (MIOA).

2.6.2 The report adheres with the principles required by the Institute of Acoustics in their Code of Conduct, and the work is within the author's own area of knowledge and expertise. Where opinions have been expressed these represent true and complete professional opinions on the matters to which they refer.

2.6.3 CSA is a full member of the Association of Noise Consultants (ANC).

3.0 ASSESSMENT CRITERIA

3.1 LOCAL AUTHORITY LIASION

3.1.1 Liaison with the Environmental Health Team of Cornwall Council has been conducted, with Chris Selby (Environmental Health Team Manager) via phone and email, with confirmation of requirements of noise assessment being provide in relation to the following key areas.

- Noise assessment to follow the guidance of BS4142:2014 – A.1:2019, and the criteria set out in DSS criteria 2;
- Any exceedance the DSS criteria 2 at existing noise sensitive receptors to the west should be considered in context of the Hendra area development and built form;
- Exceedances of the DSS criteria 2 at permitted noise sensitive receptors facades to the west of the Newquay Strategic Route should be considered in context of suitable internal noise levels being achieved.

3.2 NATIONAL PLANNING POLICY FRAMEWORK

3.2.1 In March 2012 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance within England. In its latest revision of December 2024 (with minor amendments in February 2025), Paragraph 198 of the NPPF states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

3.2.2 In addition, Paragraph 200 of the NPPF states:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or

community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

3.3 CORNWALL COUNCIL'S DEVELOPMENT SOUND STANDARD (DSS)

3.3.1 Cornwall Council's Development Sound Standard provides guidance for developers on the assessment of noise for planning applications.

3.3.2 In relation to potential noise impacts the DSS provides two noise criteria dependent on the assessment scenario, with the second criterion applicable to the assessment of sound from proposed sources of an industrial and/or commercial nature, where new noise sources are brought to existing noise-sensitive receptors. The DSS Sound Criterion 2 is applicable as repeated below.

'The rating level $L_{A,r,T,r}$ of sound from the proposed development at the curtilage of amenity areas at Noise Sensitive Receptors should not be greater than the L_{A90} background sound level. The rating level is to be determined in accordance with the methodology prescribed in BS 4142:2014.'

3.4 BS4142:2014 + A.1:2019 ASSESSMENT CRITERIA

3.4.1 British Standard 4142:2014 + A.1:2019 *Methods for rating and assessing industrial and commercial sound* describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- 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.

3.4.2 This Standard compares the sound levels in terms of a L_{Aeq} for a one-hour period during the daytime (07:00 to 23:00 hours) and a fifteen-minute period during the night-time (23:00 to 07:00 hours) due to the sound source, the "Specific Sound Level", with the existing background sound level in terms of an L_{A90} when the sound source is not operating.

3.4.3 The Specific Sound Level can be determined by various means, depending upon the relative level, of otherwise-occurring sound, i.e. the "Residual Sound Level".

3.4.4 As part of the assessment, consideration is given to the character of the sound, with acoustic character correction applied, if applicable.

Tonality

3.4.5 For sound ranging from not tonal to prominently tonal, the Joint Nordic Method gives a correction of between 0 dB and +6 dB. 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

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

Other sound characteristics

3.4.7 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 +3 dB can be applied.

Intermittency

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

Impact Assessment

3.4.9 The resultant background sound level is subtracted from the Rating Level to obtain an initial estimate of the impact.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB could be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact. 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.

3.4.10 The initial estimate of the impact is then modified by taking consideration of the context in which the sound occurs.

4.0 ENVIRONMENTAL SOUND SURVEY

4.1 A survey of the existing ambient and background sound levels was undertaken at the closest noise sensitive receptors at the proposed Newquay site, as shown in the appended site plan, AS13674/SP1. This survey was carried out to determine representative ambient and background sound levels at the nearest noise-sensitive receptors.

4.2 Sound level monitoring equipment was installed at position LT1 (Newquay) and LT1 (Newquay) as shown in site plan, AS13674/SP1 and set to record measurements of consecutive 5-minute L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels.

4.3 The sound level meter at LT1 (Newquay) was located in a free field position with microphone approximately 1.5m above local ground level.

4.4 The sound level meter at LT1 (Newquay) was installed at the monitoring position from the morning of Thursday 31st October 2024 to the evening of Saturday 2nd November 2024. The

meter at LT2 (Newquay) was installed from midday on 7th November 2025 to the morning of Tuesday 11th November 2025.

4.5 The following equipment was used during the survey:

- 1 no. NTi XL2 sound level meter (LT1 Newquay)
- 1 no. Svantek 958 sound level meter (LT2 Newquay)
- 1 no. Norsonic sound level calibrator type 1251.

4.6 An additional survey was undertaken at an existing Suez HWRC centre located on Newquay Road, Truro, which shares a similar layout to the proposed Newquay HWRC. Noise measurements were conducted of site activities to provide further information of typical noise emissions of the various HWRC activities.

4.7 Sound level monitoring equipment was installed at position LT1 (Truro) as shown in site plan, AS13674/SP2 and set to record measurements of consecutive 1-minute L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels, including third octave band data.

4.8 The sound level meter at LT1 (Truro) was located in a free field position at the boundary fence line with microphone approximately 4m above local ground level.

4.9 Sound level meter was installed at the monitoring position from midday on Friday 11th July 2025 to the morning of 14th July 2025.

4.10 During the monitoring period site operatives provided notes of activities being undertaken on site, to be correlated with noise measurements undertaken.

4.11 The following equipment was used during the survey:

- 1 no. Svantek 958 sound level meter (LT1 Truro)
- 1 no. Norsonic sound level calibrator type 1251.

4.12 The calibration of the sound level meters utilised in the surveys were verified before and after use, and no significant calibration drift was detected (<0.5 dB). Certificates of laboratory calibration of all equipment used in the survey are available on request.

4.13 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, and BS4142:2014 + A1:2019 The Standard for Methods for rating and assessing industrial and commercial sound*).

4.14 Weather data was checked to determine that the measurements during the surveys were not adversely affected by high wind speeds or heavy rain. In general, windspeeds were low and no periods of prolonged rain were observed, making the conditions suitable for measurement of environmental sound.

4.15 **NOISE SURVEY RESULTS (NEWQUAY)**

4.15.1 Figures AS13674/TH1-TH3 show the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories at measurement position LT1 at Newquay, with Figures AS13674/TH8-TH11 The same parameters at position LT2 at Newquay.

4.15.2 The average sound levels measured during the 'Daytime', 'Night-time', and 'Operational' periods at LT1 and LT2 are shown in the table below. Also shown are the typical lowest background noise level - L_{A90} , defined as the 10th percentile of the L_{A90} dataset.

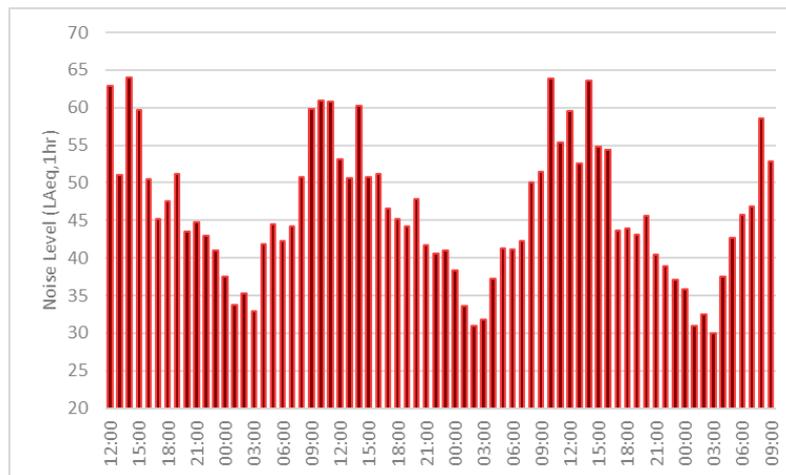
LOCATION	PERIOD	SOUND PRESSURE LEVEL	
		$L_{Aeq,T}$	TYPICAL Lowest L_{A90} (10 th PERCENTILE)
LT1 (free field)	Daytime (07:00 -23:00)	49 dB	36 dB
	Night-time (23:00-07:00)	38 dB	22 dB
	Pre-opening operations (07:00 - 09:00)	49 dB	40 dB
	Public opening hours (09:00 - 16:00)	50 dB	39 dB
LT2 (free field)	Daytime (07:00 -23:00)	49 dB	37 dB
	Night-time (23:00-07:00)	41 dB	29 dB
	Pre-opening operations (07:00 - 09:00)	49 dB	38 dB
	Public opening hours (09:00 - 16:00)	50 dB	41 dB

Table 4.1 – Results of Newquay environmental sound surveys

[dB ref. 20µpa]

4.16 NOISE SURVEY RESULTS (TRURO)

4.16.1 Figures AS13674/TH4-TH7 show the L_{Aeq} , and L_{Amax} sound pressure levels as time histories at measurement position LT1 at Truro. The Figure below shows the measured hourly noise level at the monitoring position. It can be seen that during loudest periods of HWRC operations, noise levels typically reach between $L_{Aeq,1hr}$ 60 – 64 dB at the monitoring position.



4.16.2 The results of specific HWRC activities measured at the site boundary (LT1 Truro) are provided in Table 4.2.

ACTIVITY	DURATION (MINS)	SOUND PRESSURE LEVEL, DB	
		$L_{Aeq,T}$	L_{AMAX}
Bin compaction Bin 4, green, Bin 8 metal, bin 9 cardboard, Bin 10 black back	10	69 dB	72 dB
Metal bin (#8) exchange with reverse beepers	10	64 dB	68 dB
Exchange	17	61 dB	68 dB
Exchange	14	69 dB	72 dB
Plant movement	3	67 dB	68 dB
Compaction bulk	2	62 dB	64 dB
Compaction 'green'	4	68 dB	70 dB
Compaction green	5	55 dB	57 dB
Bulky metal, card, compaction wood, green	10	68 dB	71 dB
Compaction green	5	68 dB	71 dB
Compaction (card, wood, card, black bag)	10	66 dB	71 dB
Compaction black bag, card, bulky energy	13	55 dB	57 dB
Park digger up to park	3	50 dB	52 dB
Plant movement	6	53 dB	58 dB
Bin compaction	8	69 dB	73 dB
Bin exchange - 2 lorries	20	64 dB	70 dB
Bin compaction	10	65 dB	68 dB
Bin compaction	15	67 dB	72 dB
Bin compaction	12	67 dB	72 dB
Bin compaction & park up top	7	61 dB	67 dB

Table 4.2 - Results of Specific HWRC Operations at Monitoring Location LT1 (Truro)

5.0 SOUND IMPACT ASSESSMENT

5.1 SOUND PREDICTIONS

- 5.1.1 Calculations have been undertaken to determine the likely worst-case sound emissions, in terms of an $L_{Aeq,1hr}$ from the site operations of site activities from the proposed development at the surrounding existing and potential noise-sensitive receptor.
- 5.1.2 Operational sound levels from the proposed development have been predicted using the calculation protocols defined within ISO9613-2:2024 Acoustics - *Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of*

sound pressure levels outdoors, as implemented within CadnaA noise prediction software Source sound levels from the proposed plant and operations of the development site have been predicted based on source data detailed in this report.

5.1.3 Topography for the surrounding area has been incorporated into the model from Lidar digital terrain surveys, as well as existing buildings to account for acoustic screening. The proposed site levels have been incorporated into the model. The ground absorption coefficient has been set at 0.7 within the model for soft ground, and 0 for hard ground (e.g. tarmac).

5.1.4 The proposed development has been reviewed in relation to the predominant sound emissions based on the proposed layout and include the following sources which will be included within the propagation model.

- Public vehicle movements (~ 100 per hour during peak season).
- Public unloading materials
- 360° Loader Compacting various materials.
- HGV Bin Loading / Unloading and Reverse Alarm / Beepers

5.1.5 Based on the proposed site operation and activities the following operational scenarios (1 hour period) have been considered during peak seasons, which represents pre-opening operations (07:00 - 09:00) and during public opening hours (09:00 - 16:00).

SCENARIO	DESCRIPTION	SITE OPERATIONS (1 HOUR PERIOD)
1	Pre-opening operations (07:00 - 09:00)	<ul style="list-style-type: none"> - 360° Loader Compacting (Metal \ Timber \ Green \ Cardboard) – 2.5 mins per bin. - HGV Bin Loading / Unloading – Qty: 2 - Reverse Alarm / Beepers – Qty: 2 - Glass in Loading / Unloading – Qty: 1
2	Public opening hours (09:00 - 16:00)	<ul style="list-style-type: none"> - Public vehicle movements (HWRC ~ 100 per hour during peak season / Shop ~20 per hour). - 360 Loader Compacting (Metal \ Timber) – 2.5 mins per bin. - HGV Bin Loading / Unloading – Qty: 1 - Reverse Alarm / Beepers – Qty: 1

Table 5.1 – Noise Assessment Scenarios

5.1.6 Resultant levels have been predicted at the nearest existing noise-sensitive receptors, to the west taking any screening due to existing topography into account. Predictions have not considered the potential screening of proposed buildings associated with the Hendra area of the LDO.

5.1.7 The table below details the range of predicted Specific Sound Level ($L_{Aeq,1hr}$) at the nearest noise sensitive receptors to the west. These predictions are shown graphically in Figure A13674/N1 – N4 for the different operational scenarios, with different southern noise mitigation factors.

#	SCENARIO	PREDICTED SPECIFIC SOUND LEVELS (L _{Aeq}) AT NEAREST EXISTING WESTERN NOISE-SENSITIVE RECEPTORS
1	Pre-opening operations (07:00 - 09:00)	41 - 42 dB
2	Public opening hours (09:00 - 16:00)	39 - 41 dB

Table 5.2 – Predicted Specific Sound Levels (L_{Aeq}) During Operational Periods [dB ref. 20µpa]

5.2 SOUND IMPACT ASSESSMENT (EXISTING RECEPTORS)

5.2.1 There are limited existing industrial commercial sound sources in the area and, sound generated by the proposed operations could be potentially perceivable as being distinct from the residual soundscape at the existing noise-sensitive receptors, however it is not considered that noise emissions would be tonal or impulsive at the existing noise sensitive receptors.

5.2.2 An acoustic correction (+3 dB) has been applied to the Specific Sound Levels to account for noise emissions being potentially distinct from the residual soundscape. The table below detail the outcome of the BS4142 assessments at the nearest existing noise-sensitive receptors.

ASSESSMENT	ASSESSMENT LOCATION	
	PRE-OPENING OPERATIONS (07:00 - 09:00)	PUBLIC OPENING HOURS (09:00 - 16:00)
Specific Sound Level (L _{Aeq,1hr})	41 - 42 dB	39 - 41 dB
Acoustic Feature Correction	+ 3 dB	+ 3 dB
Rating Level	44 - 45 dB	42 - 44 dB
Typical Lowest Background Sound Level (L _{A90})	40 dB	39 dB
BS 4142 Assessment Level	4 to 5 dB	3 to 5 dB
BS 4142 Initial Assessment	<i>'Indication of adverse impact, depending on the context.'</i>	<i>'Indication of adverse impact, depending on the context.'</i>

Table 5.3 – BS4142 initial Assessment – Western Existing Receptors

5.2.3 At the nearest existing noise-sensitive receptors during the worst case operational periods of the proposed development, the predicted initial Rating Level is at or around a level which provides an indication of adverse impact, depending on the context.

5.2.4 At the majority of the assessed positions the requirement of the DSS Sound Criterion is exceeded by up to 6 dB at a single receptor location. The DSS further states that

'Where Criterion 2 cannot be achieved, the noise impact assessment should include a justification as to why the proposed development should be considered acceptable in terms of noise (i.e. within planning policy).'

5.2.5 The context of the sound impact will be considered in relation to the existing noise sensitive receptors as part of the BS 4142 assessment and in relation to the magnitude of exceedance of the DSS Sound Criterion.

5.3 CONTEXTUAL DISCUSSION

5.3.1 The initial sound impact assessment has indicated that sound pressure levels from the proposed development site could be at or around a level resulting in an indication of adverse impact, depending on the context during worst case operations.

5.3.2 The potential sound impact of the development should be considered in the context of absolute sound level of operations at nearest existing noise-sensitive receptors, measured ambient sound levels, also considering the potential internal sound levels within dwellings accounting for windows being closed and open.

5.3.3 The predicted Specific Sound Level from the proposed development during operations at the worst-case receptors to the east is modest in absolute terms for worst case operations at circa L_{Aeq} 41 - 43 dB depending on pre-opening or opening operations.

5.3.4 With windows facing the proposed development, the inherent sound reduction through a partially open window (at least 10 dB) will result in noise levels from the site activities achieving desirable daytime internal noise levels based upon the BS8233:2014 guidance (when adjusted for non-anonymous noise).

5.3.5 With windows closed, sound levels would be attenuated further and will be well below the targets for internal noise levels.

5.3.6 Measured ambient noise levels (L_{Aeq}) representative of the existing eastern noise sensitive receptors are around 50 dB. The predicted Specific Sound Level from the proposed development at these locations is significantly below this level and is unlikely to result in an any significant or perceptible increase in ambient noise levels.

5.3.7 Further context relates to measured background noise levels as these were conducted before the Newquay Strategic Route was operational. Now that this is open and operational, background noise levels in the local area may have marginally increased (1-2 dB) based on the influence of road traffic.

5.3.8 An indicative site plan of the Hendra LDO area indicates that office buildings are proposed between the HWRC and the residential dwellings which will provide further acoustic reductions, which haven't been factored into the noise model.

5.3.9 It is considered that the indicated impact from the HWRC will be temporary in nature (circa 1-2 years) due to the construction of the Hendra area building massing providing further acoustic reductions.

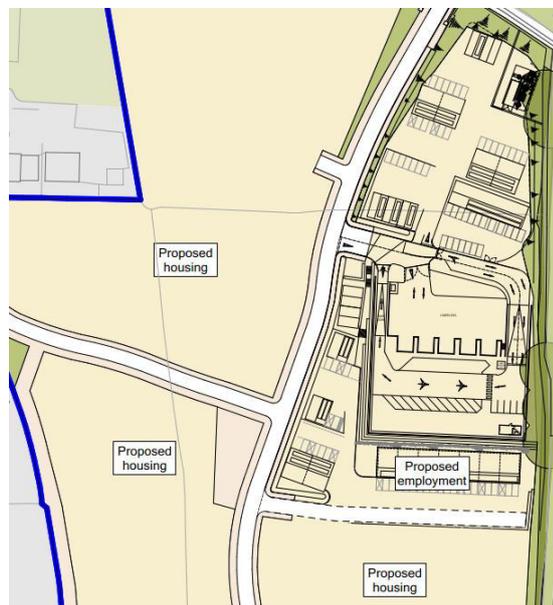
5.3.10 With the context taken into account, the overall BS4142 assessment for operational periods at existing surrounding noise sensitive receptors the sound impacts at all receptor locations would be low and meets the overarching aim of Cornwall Council's DSS.

5.4 CONTEXTUAL SOUND IMPACT ASSESSMENT (HENDRA PROPOSED RECEPTORS)

5.4.1 The Hendra area of the Nansledan LDO is being developed to include a mixture of commercial / industrial uses and residential development. It is likely that commercial / industrial uses will be located to the east of the NSR and directly to the south of the HWRC. Residential development is likely to be located to the west of the NSR and to the east of the NSR on the area of land between the commercial development and the A392 in the southeast corner of the Hendra LDO development area.

5.4.2 The full details of the layout of parcels of land are not known, though following the design guidance applied to the residential dwellings in the Nansledan area, residential property frontages are located on the NSR, with private amenity spaces located to the rear of properties. It is envisioned that this will be replicated in the Hendra area of the LDO.

5.4.3 The figure below shows an indicative layout of the location of proposed residential aspects of the Hendra area in relation to the proposed HWRC and commercial areas.



Western Residential Receptors

5.4.4 The ambient and background noise level in the Hendra area of the LDO in close vicinity to the NSR will increase as a result of the NSR becoming operational.

5.4.5 The predicted noise level from the NSR at a distance of 10 metres is predicted to be $L_{Aeq,16hr}$ 65 dB based on NSR traffic flows detailed in the Nansledan ES.

5.4.6 Based on historical measurement data of free-flowing traffic, an estimate has been made of future background noise levels at residential façades to the west of the NSR between 07:00 – 16:00 hours of circa 55 dB.

5.4.7 The Table below shows an indicative BS 4142 assessment of the HWRC on the proposed permitted residential dwellings to the West of the NSR.

ASSESSMENT	ASSESSMENT SCENARIO	
	PRE-OPENING OPERATIONS (07:00 - 09:00)	PUBLIC OPENING HOURS (09:00 - 16:00)
Specific Sound Level ($L_{Aeq, 1hr}$)	46 - 54 dB	44 - 50 dB
Acoustic Feature Correction (Impulsivity / Tonality)	+ 6 dB	+ 6 dB
Rating Level	52 - 60 dB	50 - 56 dB
Estimated Background Sound Level (L_{A90})	55 dB	55 dB
BS 4142 Assessment Level	-3 to 5 dB	-5 to 1 dB
BS 4142 Initial Assessment	<i>Between 'Indication of low impact, depending on the context.' and 'Indication of adverse impact, depending on the context.'</i>	<i>'Indication of low impact, depending on the context.'</i>

Table 5.4 – BS4142 Indicative Assessment – Western Permitted Receptors

- 5.4.8 At the facades of the nearest proposed permitted noise-sensitive receptors to the west of the NSR during the operational periods of the proposed development, the predicted initial Rating Level is typically below or at the estimated Background Sound Level at the worst-case locations, and up to 5 dB above during pre-opening periods, which generally provides an indication of low impact, depending on the context.
- 5.4.9 At the majority of locations, the requirement of the DSS Sound Criterion is achieved.
- 5.4.10 The contextual assessment can take into account the fact that absolute potential noise levels are below the ambient road traffic noise levels predicted due to the NSR, and that private amenity spaces will be located behind building massing providing further acoustic reductions.
- 5.4.11 Suitable internal noise levels from HWRC operations within proposed residential dwellings to the west can be achieved with standard double-glazed windows and acoustic whole house ventilation (e.g. trickle vents).
- 5.4.12 With the context taken into account, the indicative BS4142 assessment for HWRC operational periods at proposed noise sensitive receptors would be an indication of low impact.
- 5.4.13 The noise assessment indicates that no specific noise mitigation measurements are required (other than those proposed that are intrinsic to the design) to reduce potential noise impacts on proposed residential receptors of the LDO development area, and that the design of the proposed development meets the requirements of the LDO EIA ES chapter.

Southern Residential Receptors

- 5.4.14 The potential sound impact of the operation of the HWRC on Hedra receptors to the south of the site is dependent on the phasing of the construction of commercial

buildings proposed to the south of the HWRC which will act as a noise barrier to these receptors.

5.4.15 Consultation has been conducted with the Duchy of Cornwall in relation to the commercial and residential aspects to the south of the HWRC, who has indicated that the sound impact assessment should be assessed under the presumption that the commercial development (6m height) will come forward before the housing to the south of the HWRC.

5.4.16 However, the sound impact has also been considered in the case that the residential development to the south came forward before the commercial aspect, with a two-metre-high bund, and two-metre acoustic fence on the top (or acoustic equivalent) would be installed in the location of the commercial building.

5.4.17 In relation to the orientation of the southern residential receptors the Duchy have confirmed that residential property frontages will face north towards the HWRC, with private amenity spaces located to the rear of properties.

5.4.18 Noise predictions have been conducted based on two scenarios for phasing of the development to the south of the HWRC. As part of the noise modelling, the Duchy of Cornwall have confirmed that an additional acoustic fence along the western side of the commercial units will be installed. This fence has been modelled at 3.2 metres in height. The acoustic fence along the western boundary of the HWRC site has also been included within the modelling.

5.4.19 The Table below shows an indicative BS 4142 assessment of the HWRC on the proposed permitted residential dwellings to the South of the HWRC with proposed commercial buildings in situ. The typical background noise level is based on noise measurements conducted at Location LT2 (Newquay).

ASSESSMENT	ASSESSMENT SCENARIO	
	PRE-OPENING OPERATIONS (07:00 - 09:00)	PUBLIC OPENING HOURS (09:00 - 16:00)
Specific Sound Level ($L_{Aeq,1hr}$)	39 dB	36 - 37 dB
Acoustic Feature Correction (Impulsivity / Tonality)	+ 6 dB	+ 6 dB
Rating Level	45 dB	42 - 43 dB
Typical Lowest Background Sound Level (L_{A90})	38 dB	41 dB
BS 4142 Assessment Level	+7 dB	+1 to +2 dB
BS 4142 Initial Assessment	<i>'Indication of adverse impact, depending on the context.'</i>	<i>'Indication of low impact, depending on the context.'</i>

Table 5.5 – BS4142 Indicative Assessment – Southern Permitted Receptors (Commercial)

5.4.20 Under this scenario at the facades of the nearest proposed permitted noise-sensitive receptors to the south during the operational periods of the proposed

development, the predicted initial Rating Level is marginally above the typical lowest background sound Level, and up to 7 dB above during pre-opening periods, which could be an indication of adverse impact, depending on the context.

5.4.21 The Table below shows an indicative BS 4142 assessment of the HWRC on the proposed permitted residential dwellings to the South of the HWRC with proposed commercial buildings in situ. The typical background noise level is based on noise measurements conducted at Location LT2 (Newquay).

ASSESSMENT	ASSESSMENT SCENARIO	
	PRE-OPENING OPERATIONS (07:00 - 09:00)	PUBLIC OPENING HOURS (09:00 - 16:00)
Specific Sound Level ($L_{Aeq,1hr}$)	45 - 46 dB	41 - 44 dB
Acoustic Feature Correction (Impulsivity / Tonality)	+ 6 dB	+ 6 dB
Rating Level	51 - 52 dB	47 - 50 dB
Typical Lowest Background Sound Level (L_{A90})	38 dB	41 dB
BS 4142 Assessment Level	+11 dB to +14 dB	+6 to +9 dB
BS 4142 Initial Assessment	<i>'Indication of significant adverse impact, depending on the context.'</i>	<i>Tending towards 'Indication of significant adverse impact, depending on the context.'</i>

Table 5.6 – BS4142 Indicative Assessment – Southern Permitted Receptors (Bund / Fence)

5.4.22 Under this scenario at the facades of the nearest proposed permitted noise-sensitive receptors to the south during the operational periods of the proposed development, the predicted initial Rating Level is above the typical lowest background sound Level, and up to 14 dB above during pre-opening periods, which could be a significant adverse impact, depending on the context.

5.4.23 The context of the impact is that the potential noise levels are below the ambient noise levels at LT2 and that private amenity spaces will be located behind building massing providing further acoustic reductions.

5.4.24 Suitable internal noise levels from HWRC operations within proposed residential dwellings to the west can be achieved with standard double-glazed windows and acoustic whole house ventilation (e.g. trickle vents).

5.4.25 With the context taken into account, the indicative BS4142 assessment for operational periods at the southern proposed noise sensitive receptors would be low in the long term, subsequent to the construction of the commercial buildings.

5.4.26 The noise assessment indicates that no specific noise mitigation measurements are required (other than those proposed that are intrinsic to the design) to reduce potential noise impacts on proposed residential receptors of the LDO development area, and that

the design of the proposed development meets the requirements of the LDO EIA ES chapter.

5.4.27 However, should the residential development to the south come forward before the commercial aspect, and the proposed bund / fence is required to be removed and cleared before and during the construction of the commercial buildings. The noise impact on the residential element could potentially increase due to the removal of mitigation. During this intermittent period, temporary noise mitigation or HWRC management plans may require to be considered.

6.0 UNCERTAINTY

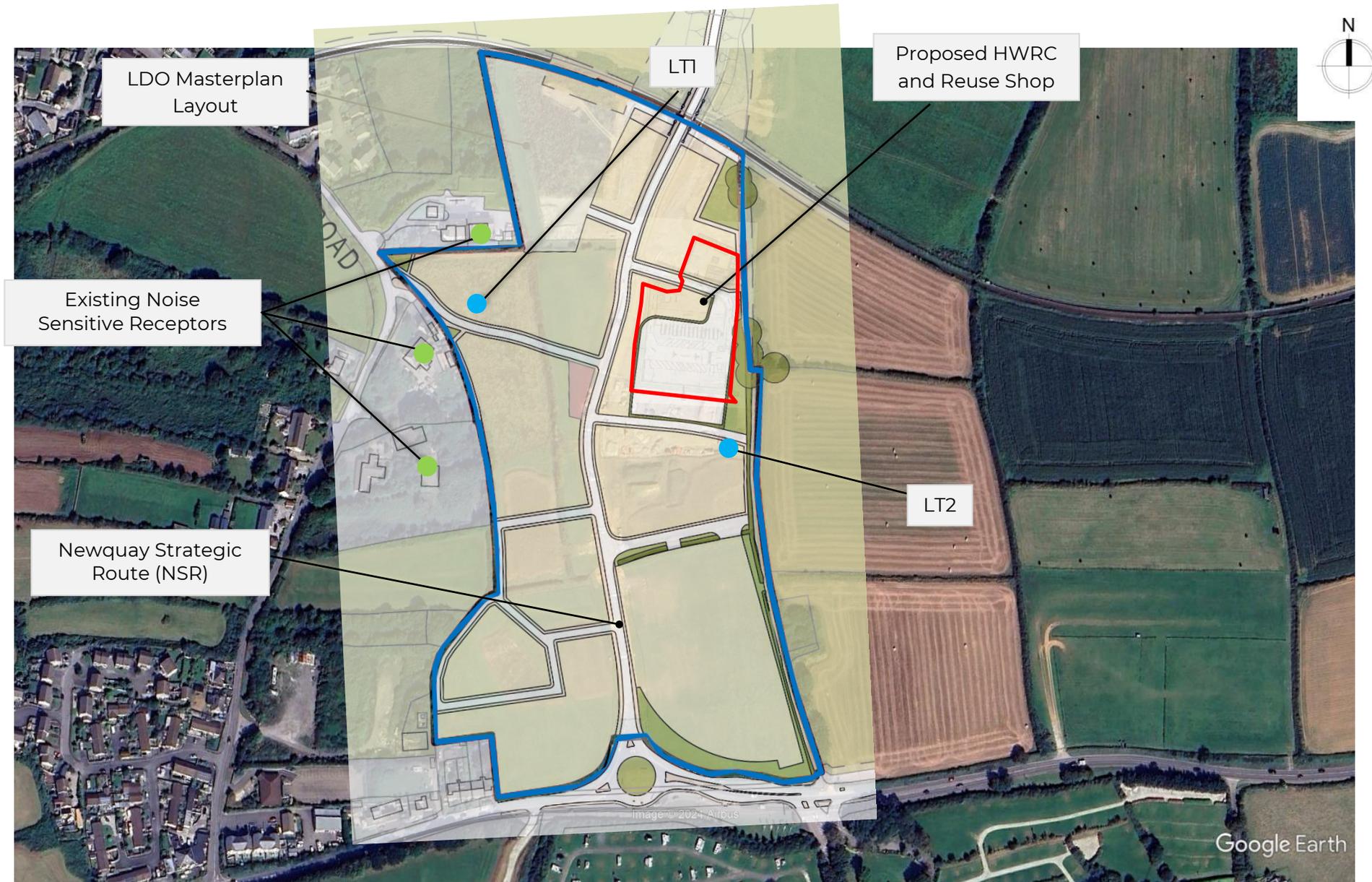
- 6.1 As per BS4142:2014, the uncertainty in the assessment is considered and reported. This is not an indication of error but an acknowledgment of possible variability of the factors contributing to the assessment.
- 6.2 Use of a calibrated type 1 sound level meter and highly experienced survey engineers is considered to reduce measurement instrument error to insignificant levels as compared with environmental variations.
- 6.3 The necessary use of calculations to predict the Specific Sound Level use measured source data and reduces possible error associated with correcting for the residual sound climate.
- 6.4 It was possible to locate the monitoring position for the background sound climate close to the Assessment Position, which minimises uncertainty in respect of the '*acoustically equivalent*' monitoring location.
- 6.5 Extended monitoring and use of the typical lowest background sound level in the assessment reduces and accounts for uncertainty in this regard.
- 6.6 Residual uncertainty related to the outcome of the BS4142 assessment is considered to be low.

7.0 CONCLUSIONS

- 7.1 This noise assessment accompanies the Mitigation Checklist submission for a Household Waste Recycling Centre (HWRC) and / Re-Use Centre/Shop within the Hendra area of the Nansledan LDO site. The development is approved as part of the 2021 Nansledan LDO.
- 7.2 This report has considered the acoustic assessment of the proposed development to British Standard 4142:2014 + A.1:2019 Methods for rating and assessing industrial and commercial sound, and Cornwall Council Development Sound Standard (DSS).
- 7.3 A sound survey has been conducted at locations representative of the nearest noise-sensitive receptors to determine typical ambient and background sound levels during the operating hours.
- 7.4 Additional noise measurements have been conducted at a similar HWRC located in Truro to determine representative noise emissions from the HWRC site.
- 7.5 Predicted sound levels of the proposed development operations have been calculated within locations of the nearest existing noise-sensitive receptors and potential residential development within the Hendra area of the LDO.
- 7.6 An assessment of the site to British Standard 4142:2014 + A.1:2019 Methods for rating and assessing industrial and commercial sound has been conducted to determine the potential impact of the development on existing surrounding noise sensitive receptors.
- 7.7 With consideration of the predicted Specific Sound Level and context of the existing ambient sound climate at the receptors, the assessment concludes that the residual noise impacts during the operation of the proposed development would be low.
- 7.8 The noise assessment indicates that no specific noise mitigation measurements are required (other than those proposed that are intrinsic to the design) to reduce potential noise impacts on proposed residential receptors of the LDO development area, and that the design of the proposed development meets the requirements of the LDO EIA ES chapter

MMcLoughlin

Mike McLoughlin MIOA
 CLARKE SAUNDERS ACOUSTICS

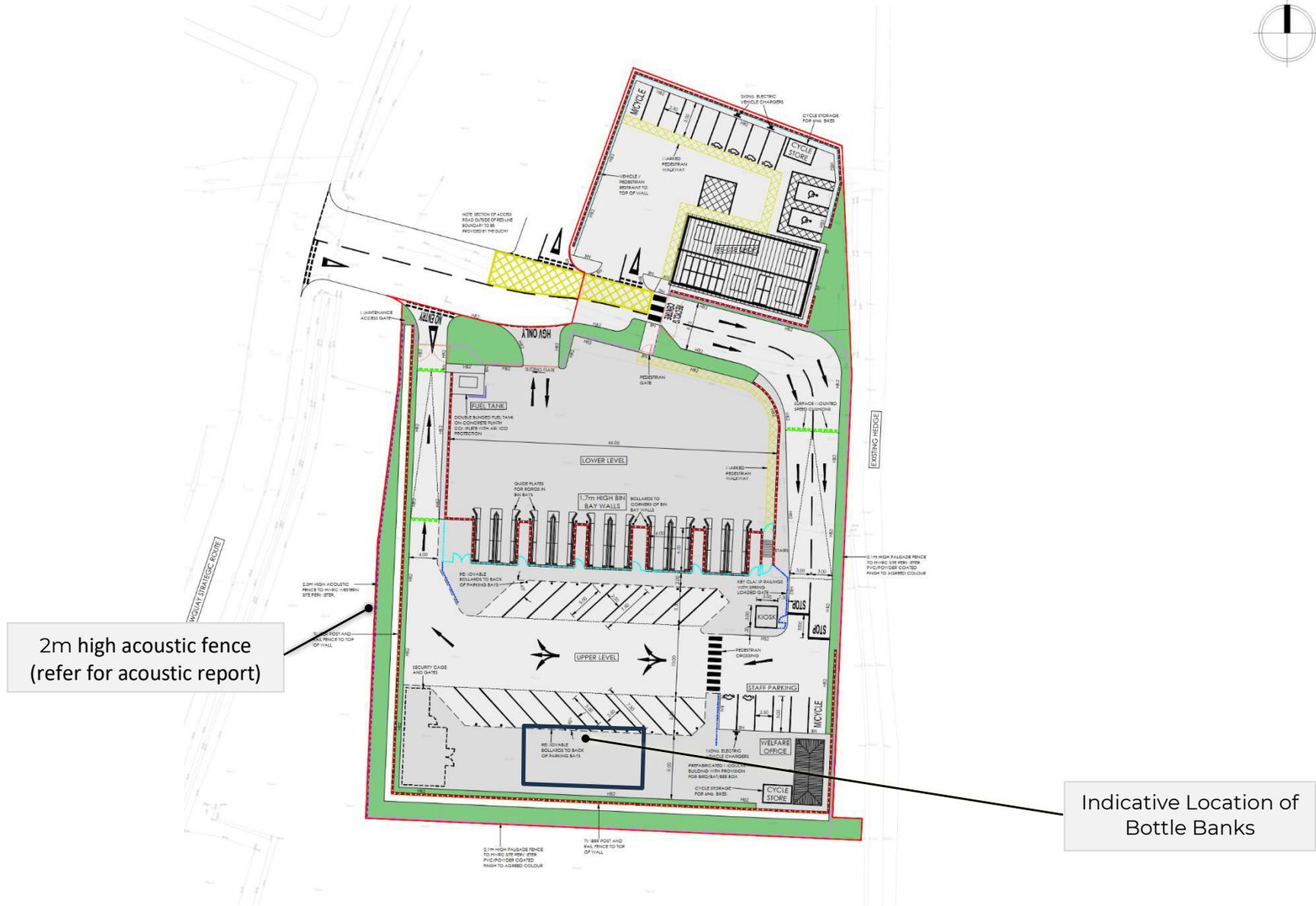
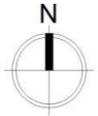


Indicative Site Plan and Monitoring Location

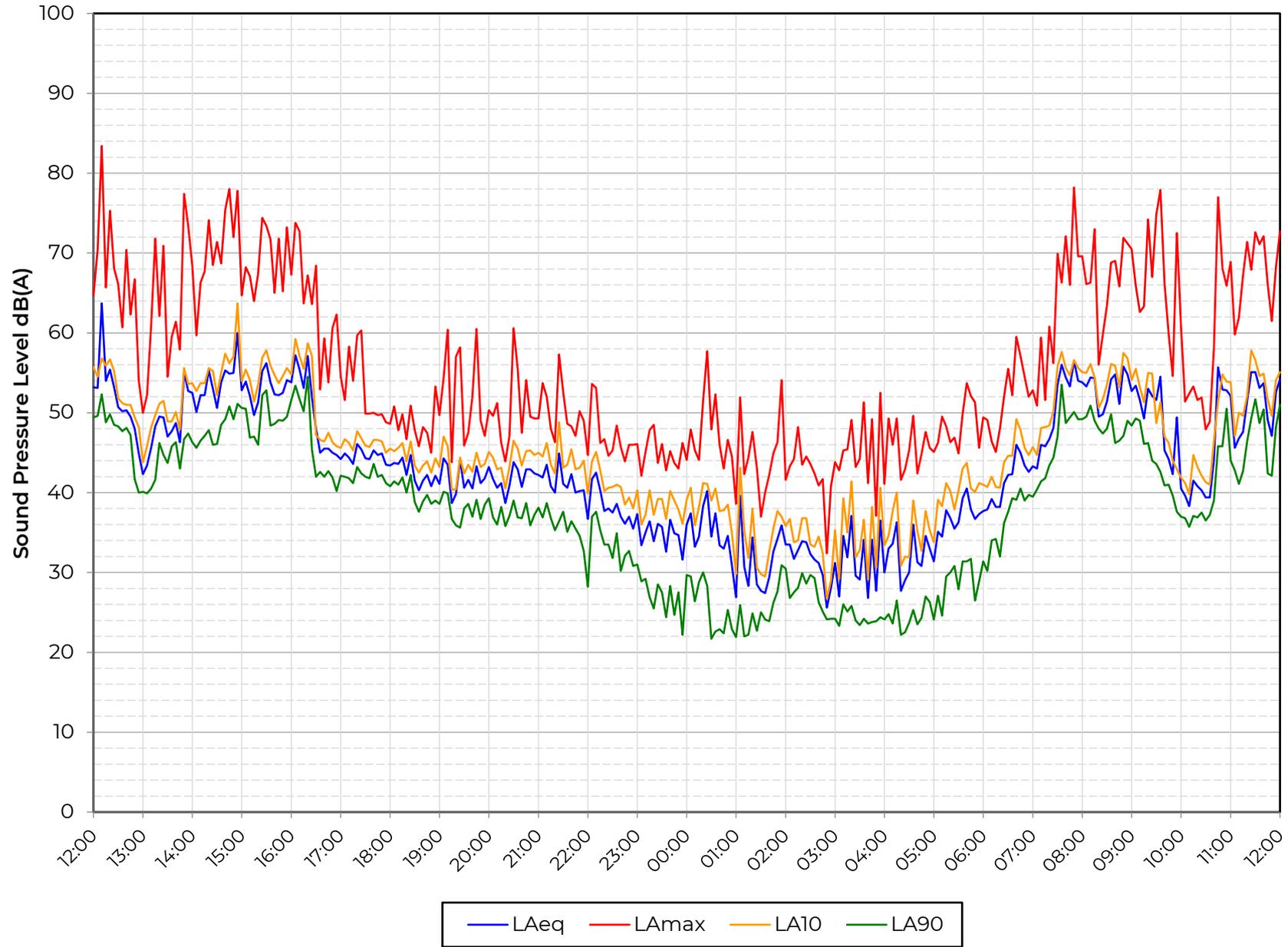


Truro Site Plan and Monitoring Locations

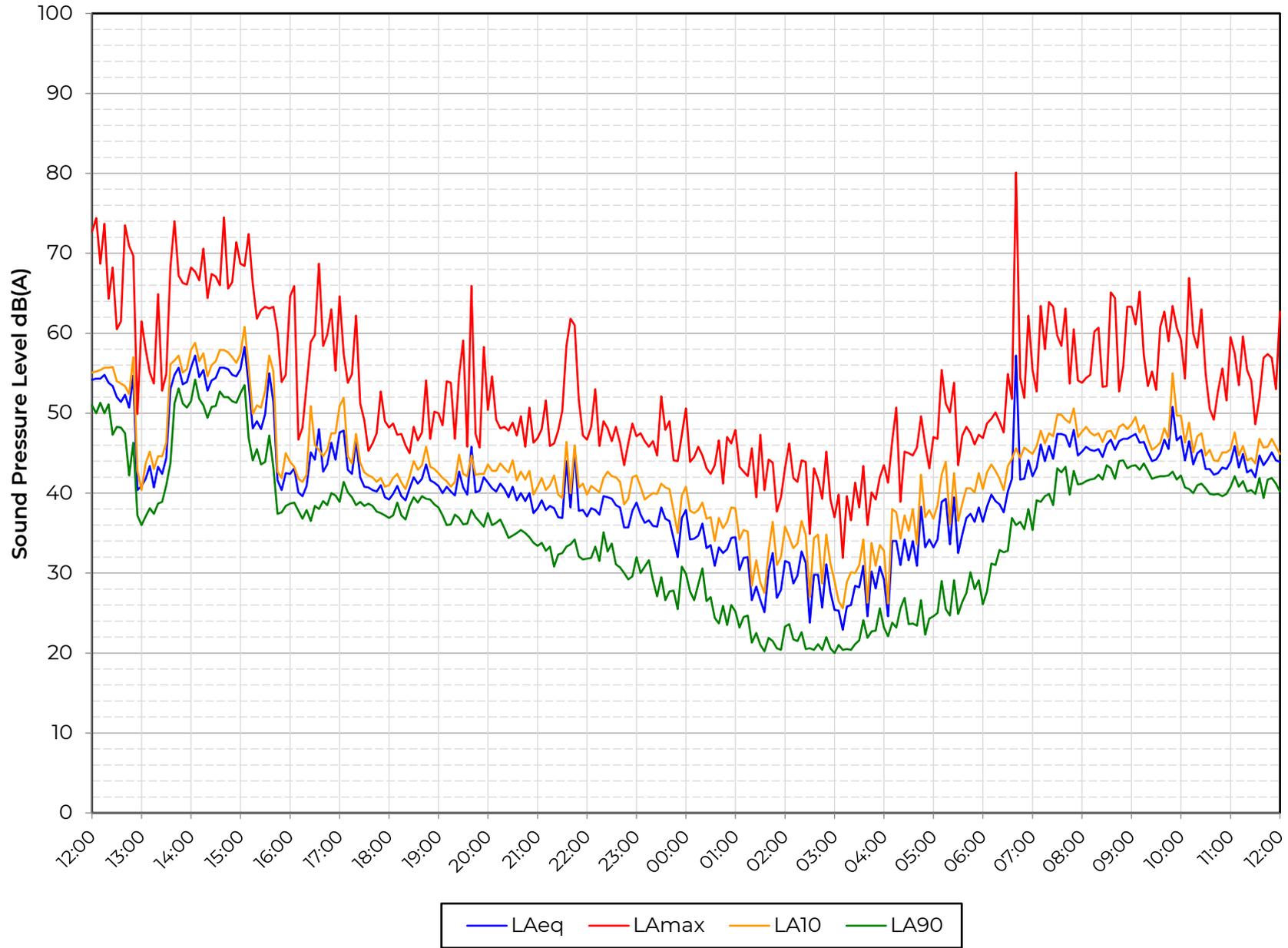
Figure 13674.250714.SP2



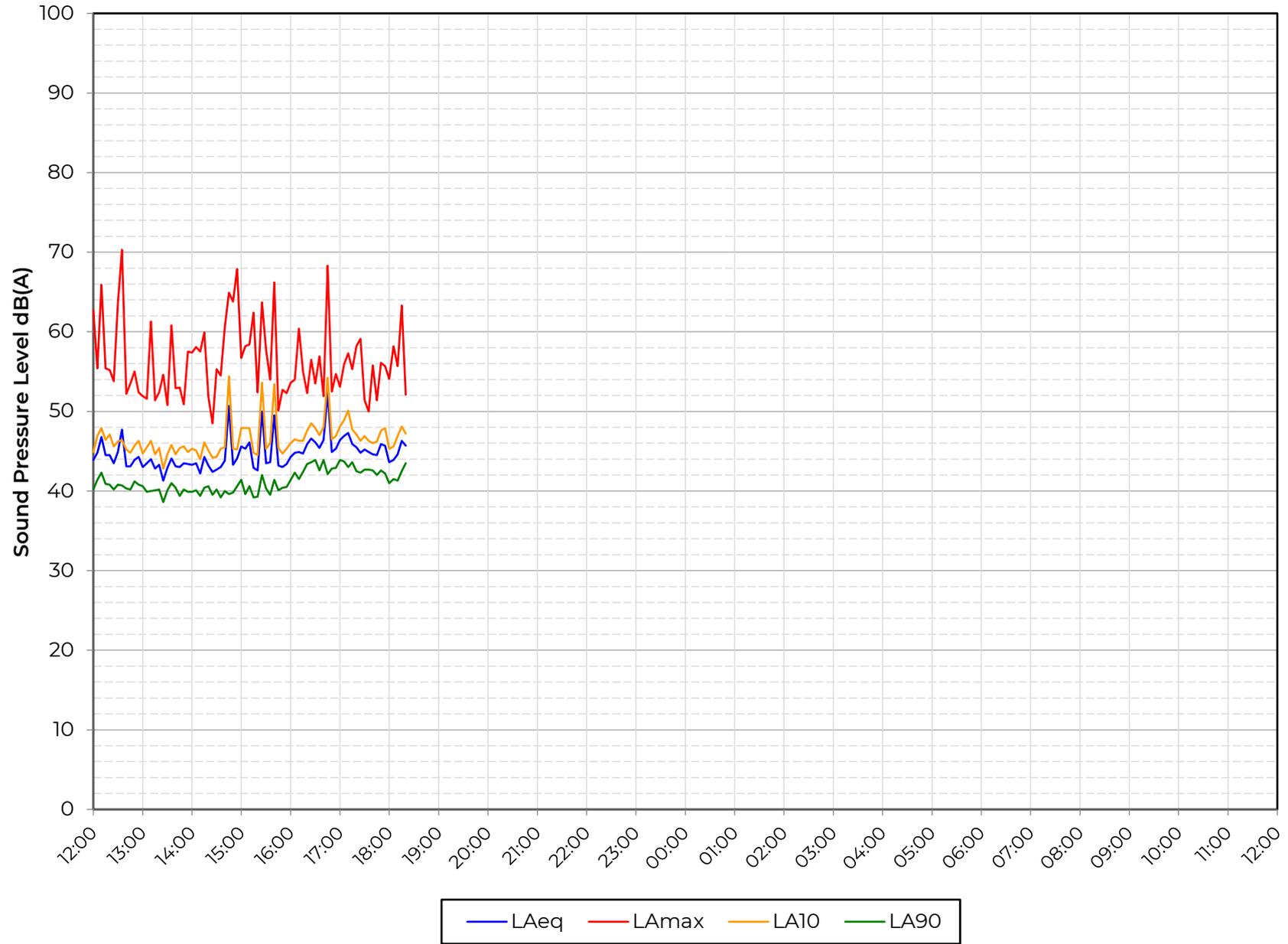
Position LTI

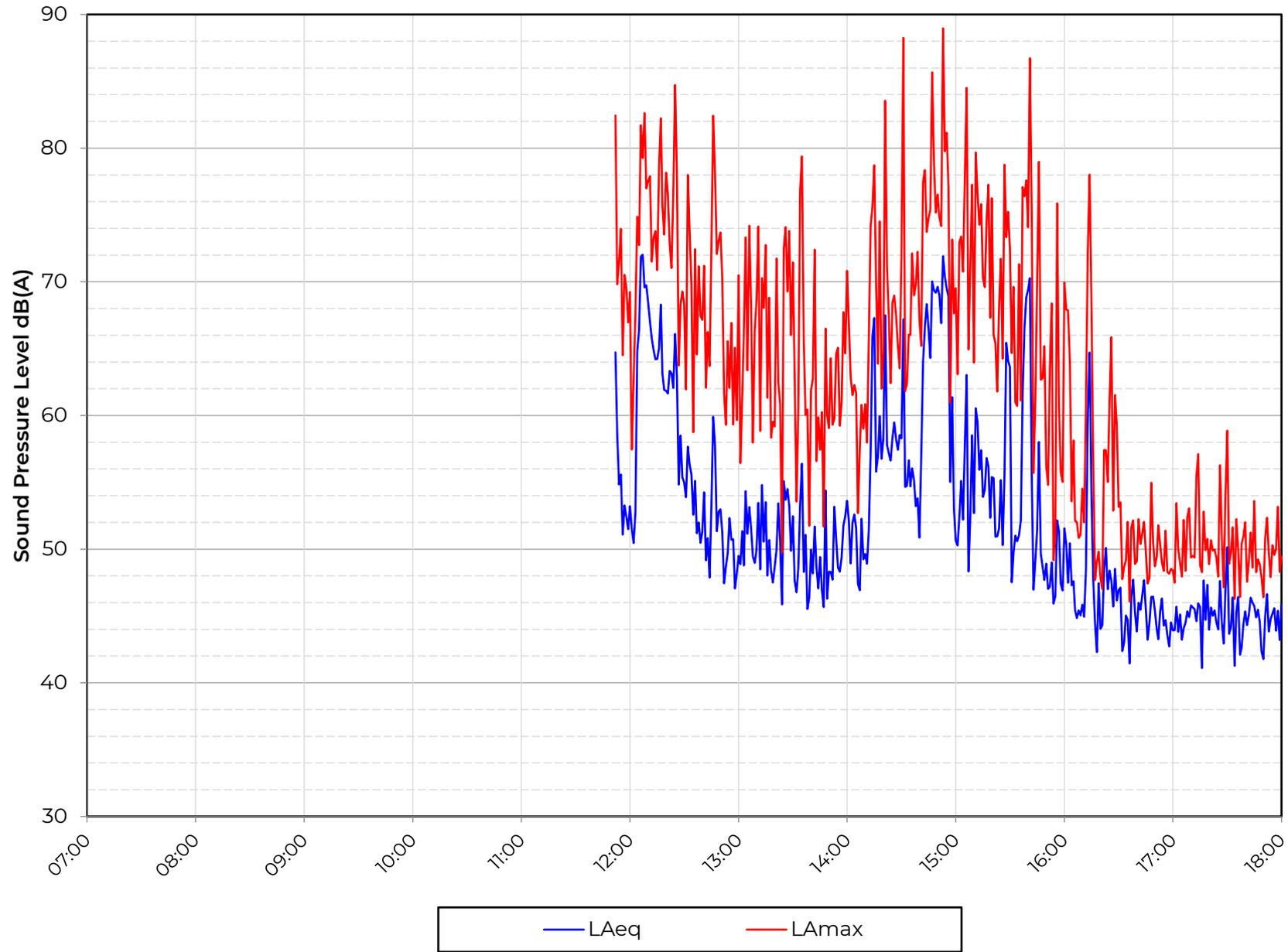


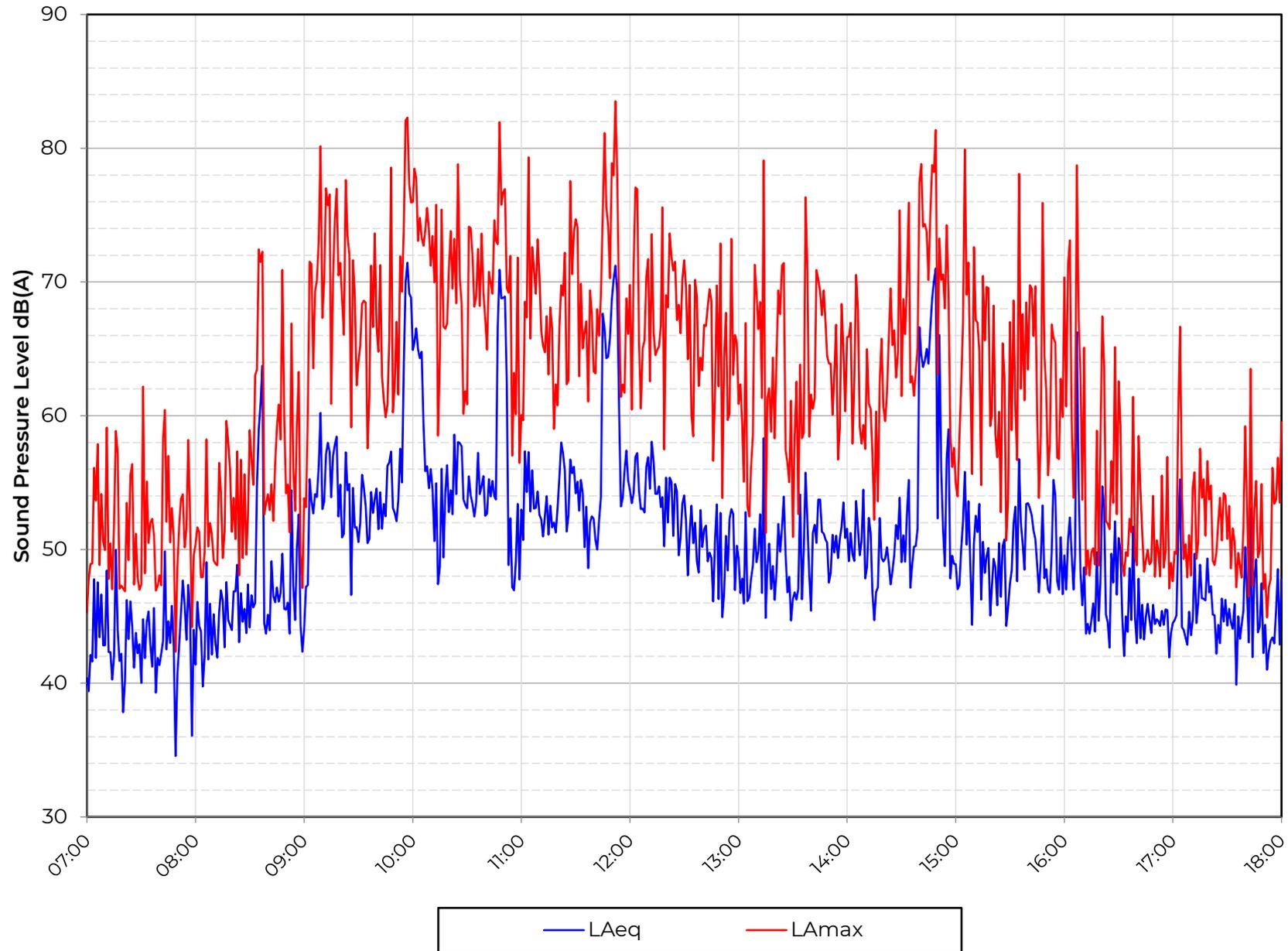
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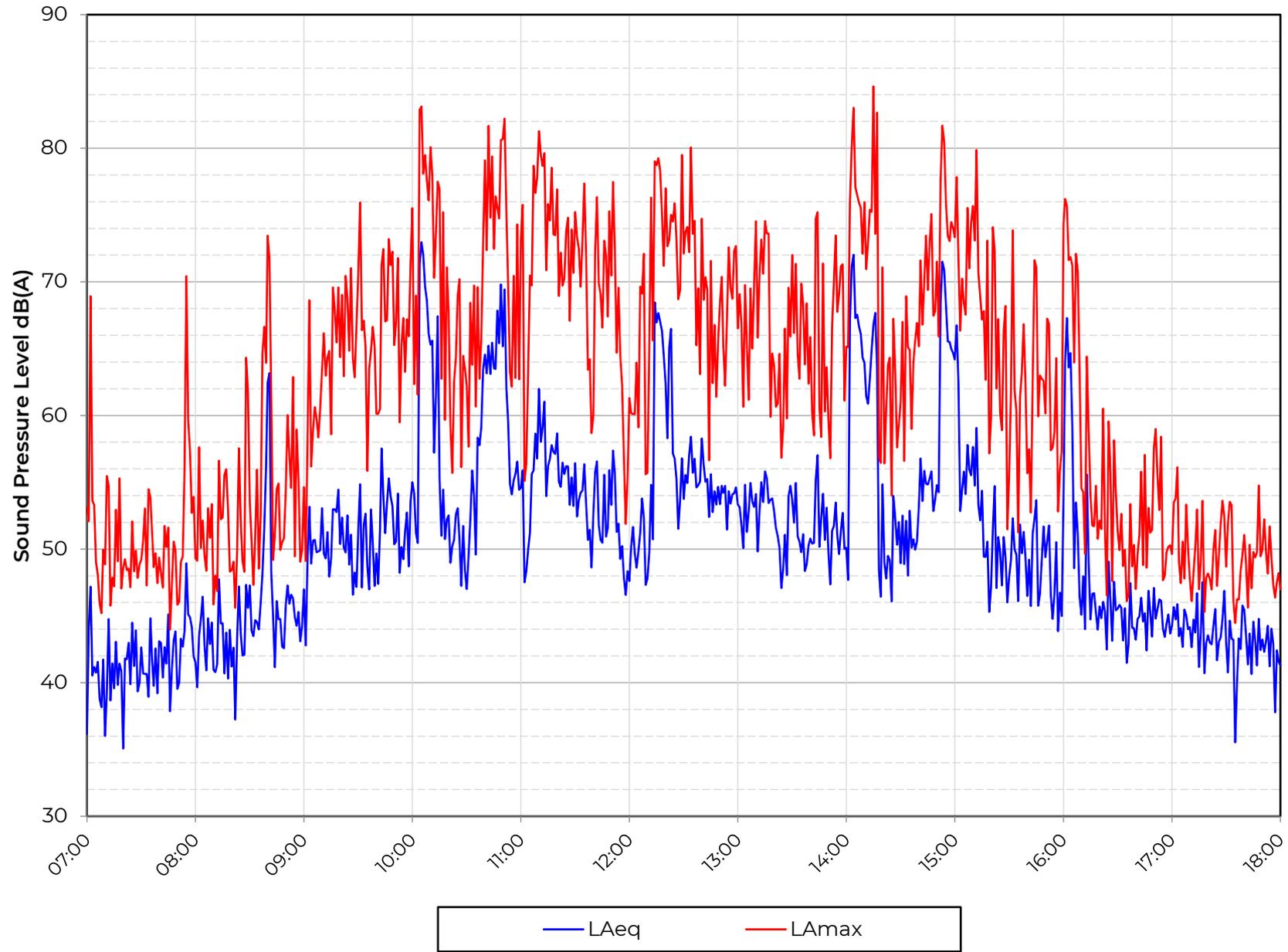


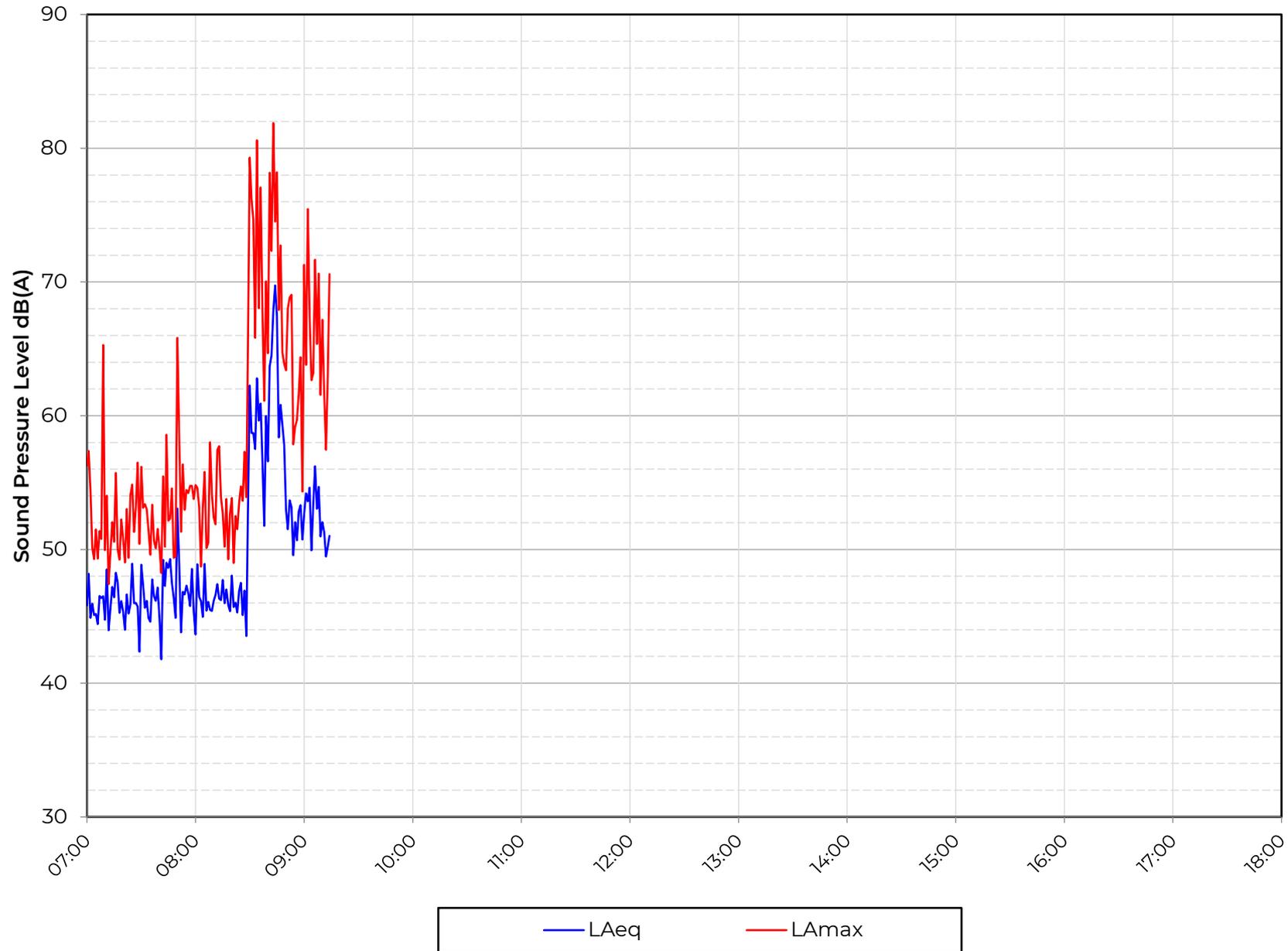
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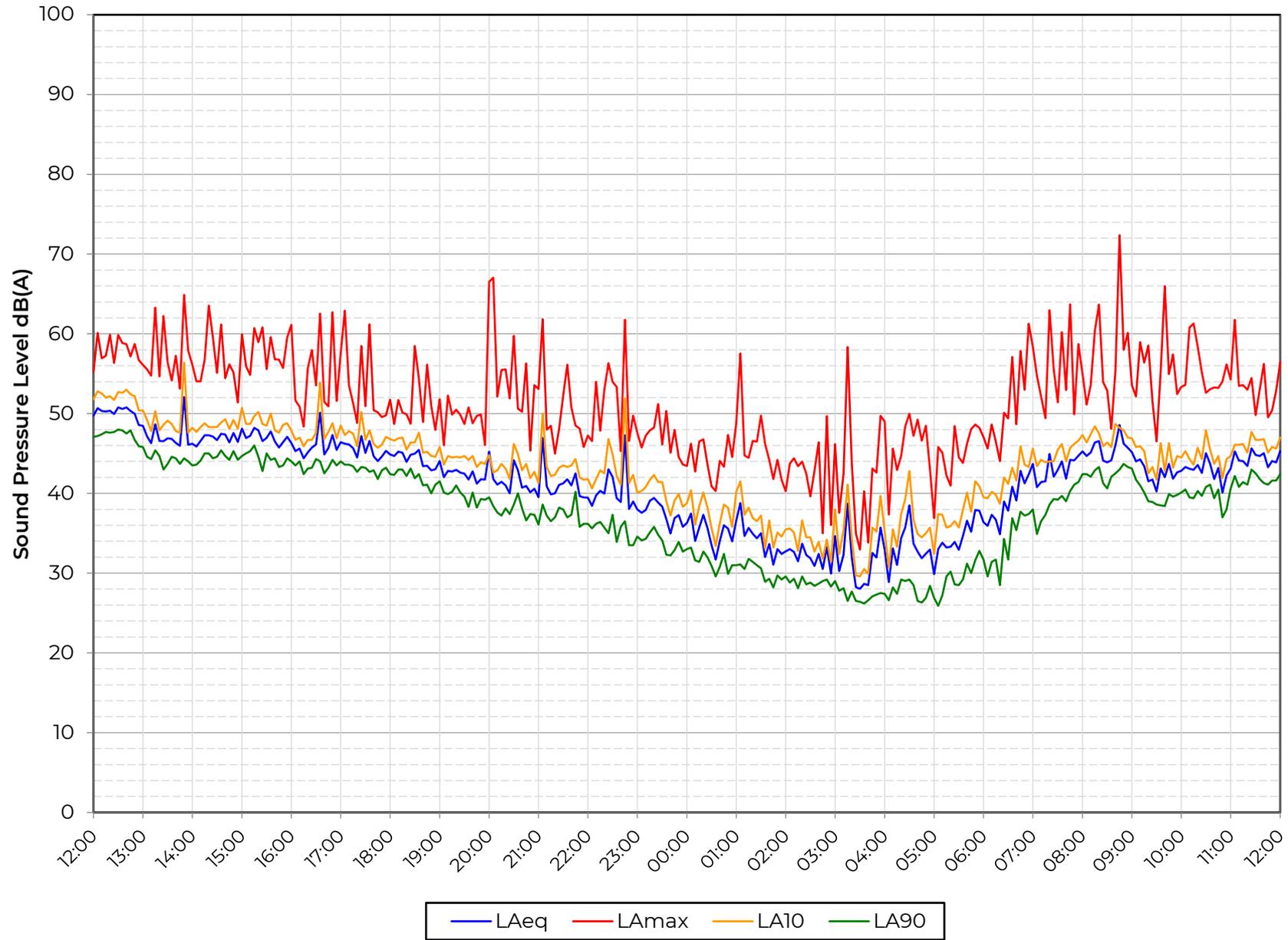






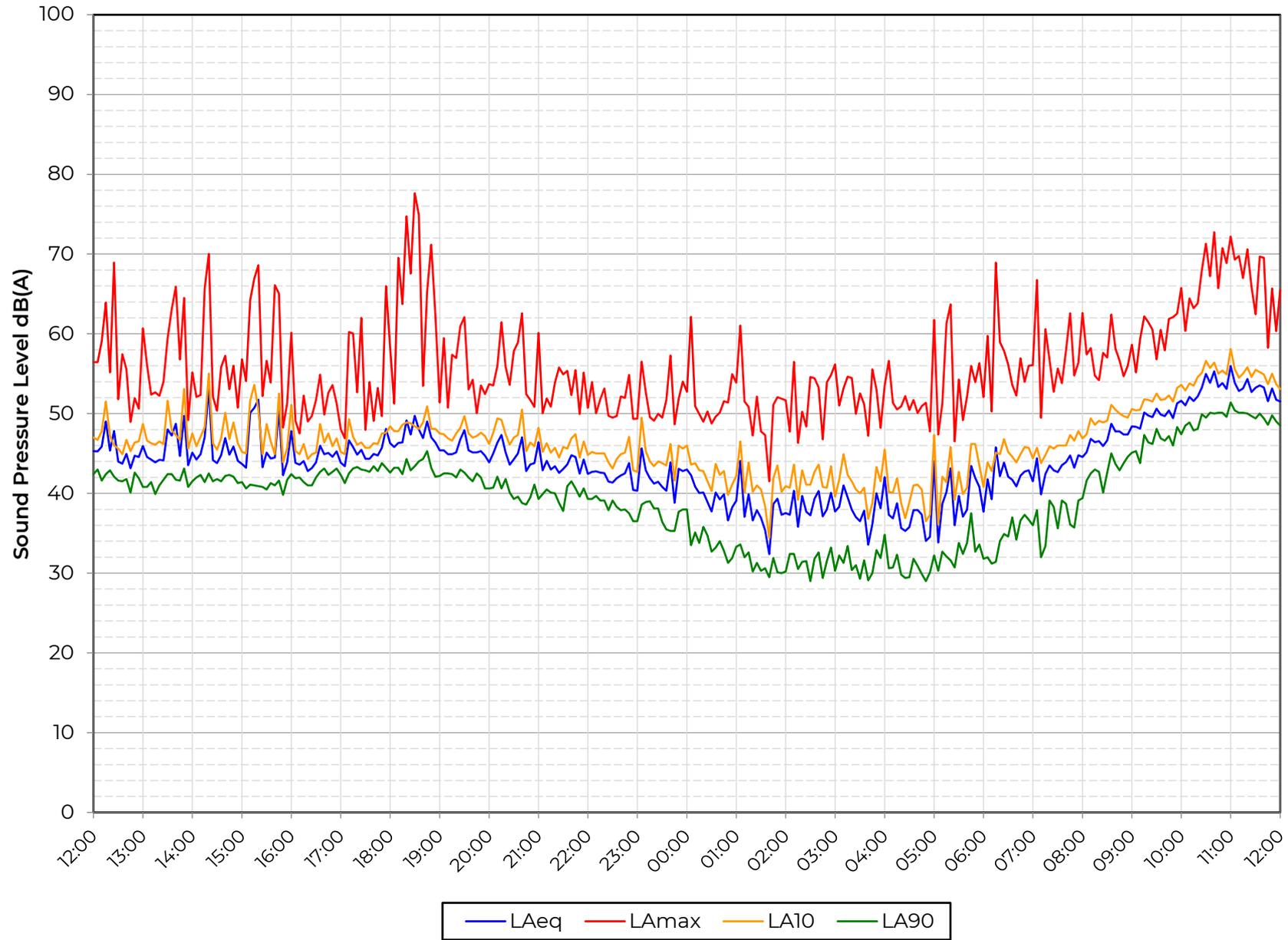


Position LT2



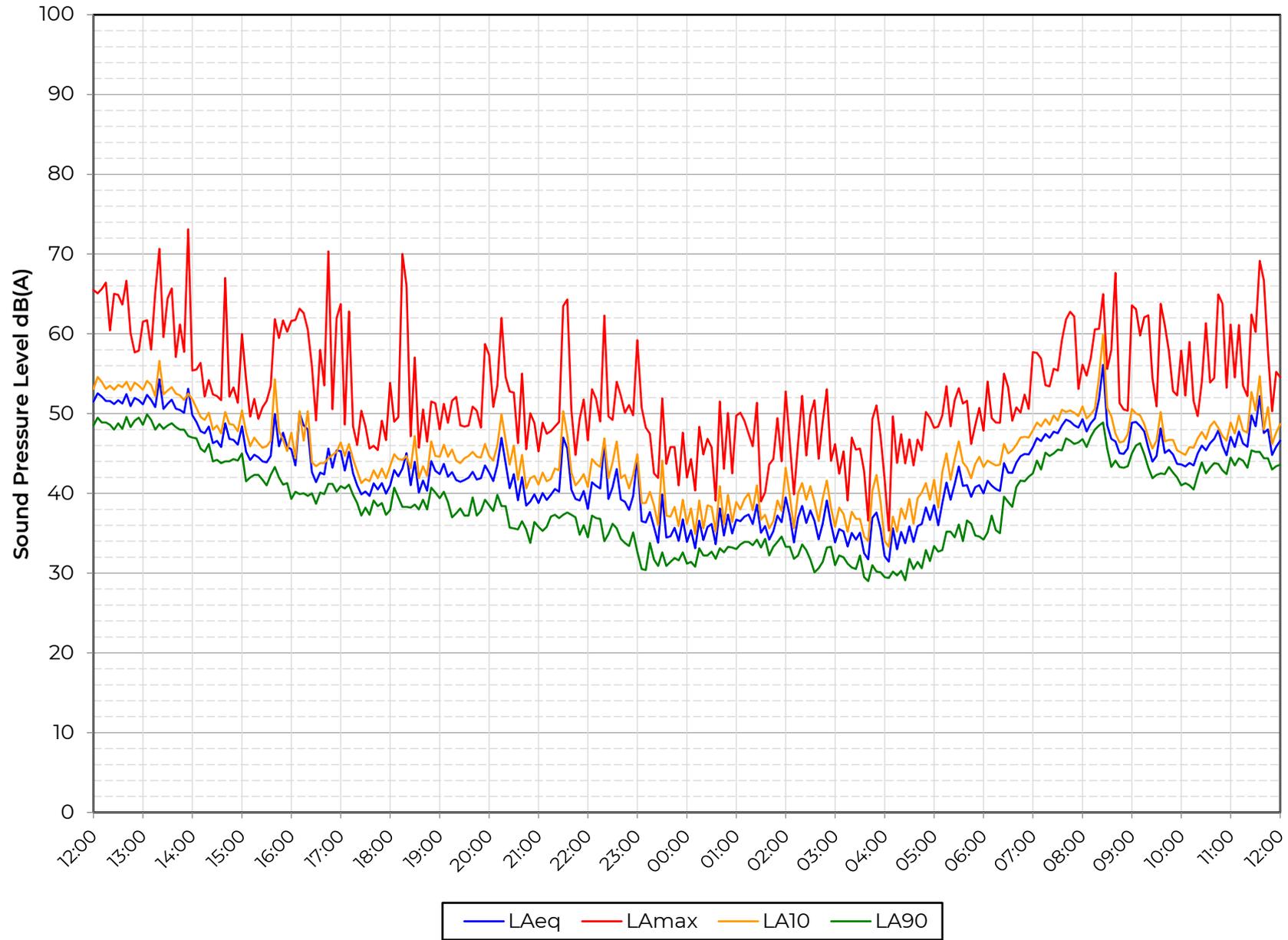
Newquay HWRC

Position LT2



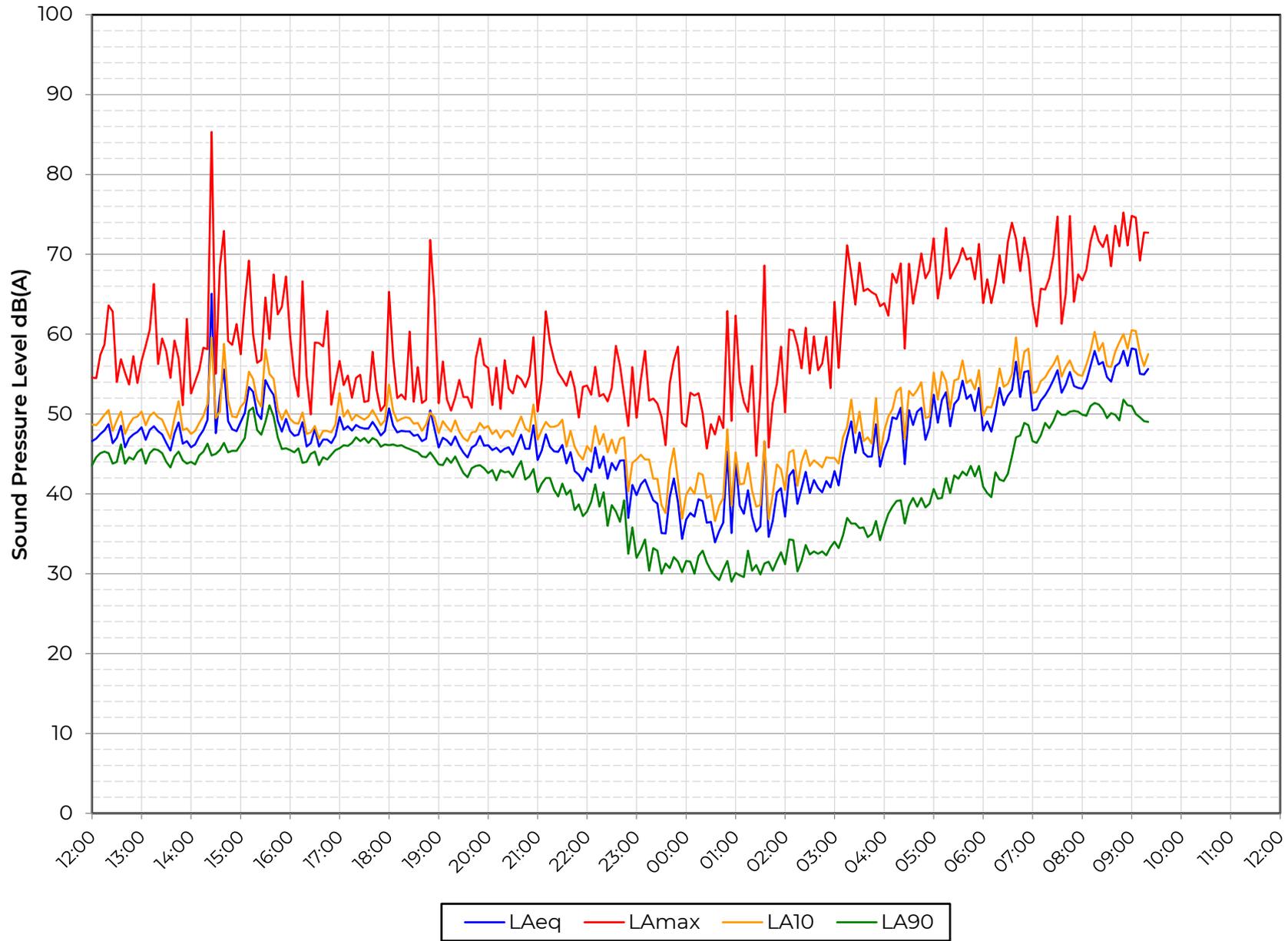
Newquay HWRC

Position LT2



Newquay HWRC

Position LT2



Clarke Saunders Associates

Newquay HWRC
Predicted LAeq,1hr
Noise Level

Pre-Opening
Southern Commercial
Buildings

Receptor Height:
1.5m AGL

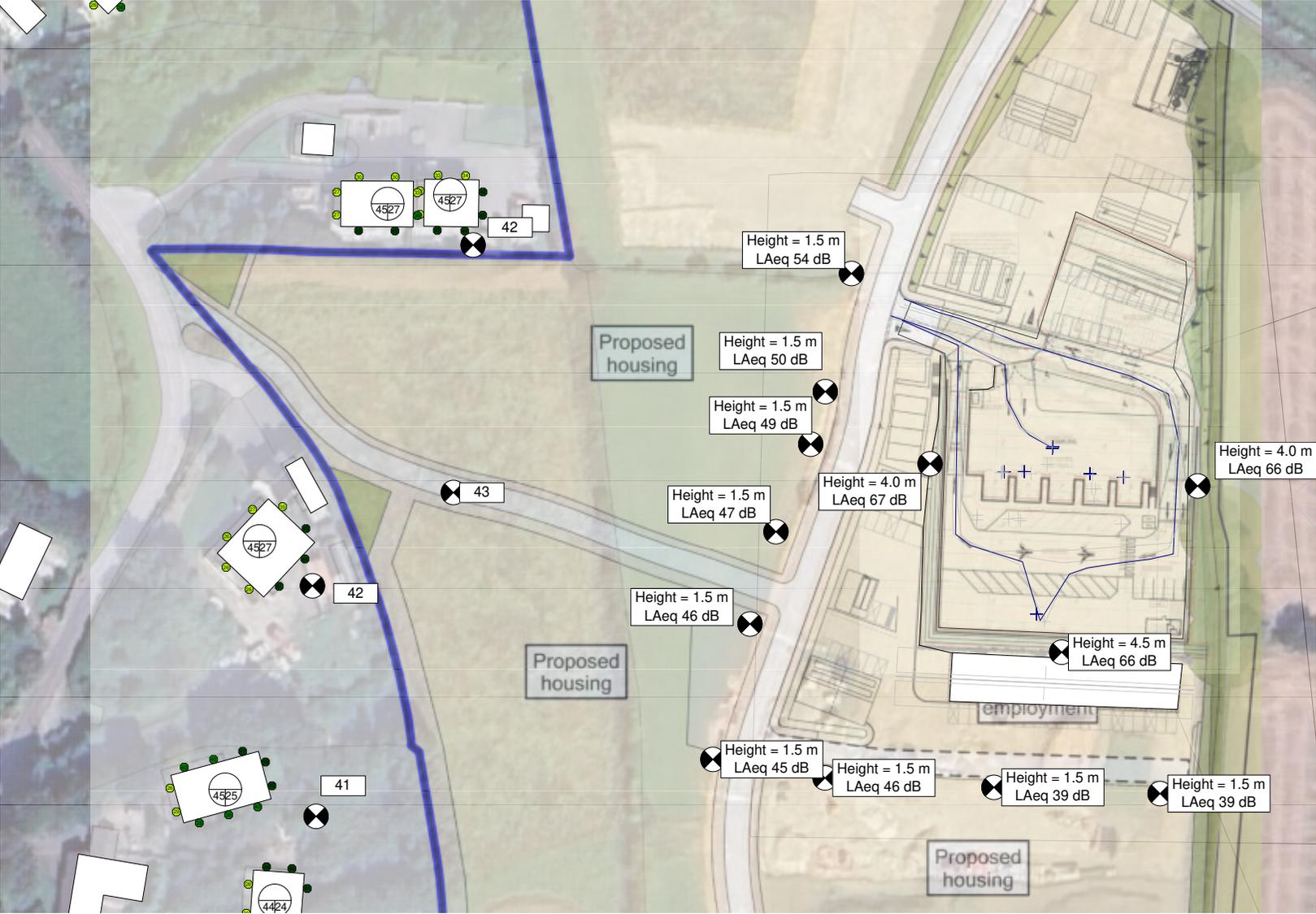
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AS13674/N1



Scale 1:1500@ A4

Key (dBA)

- █ > -99.0 dB
- █ > 35.0 dB
- █ > 40.0 dB
- █ > 45.0 dB
- █ > 50.0 dB
- █ > 55.0 dB
- █ > 60.0 dB
- █ > 65.0 dB
- █ > 70.0 dB
- █ > 75.0 dB
- █ > 80.0 dB
- █ > 85.0 dB



Clarke Saunders Associates

Newquay HWRC
 Predicted LAeq,1hr
 Noise Level

Opening
 Southern Commercial
 Buildings

Receptor Height:
 1.5m AGL

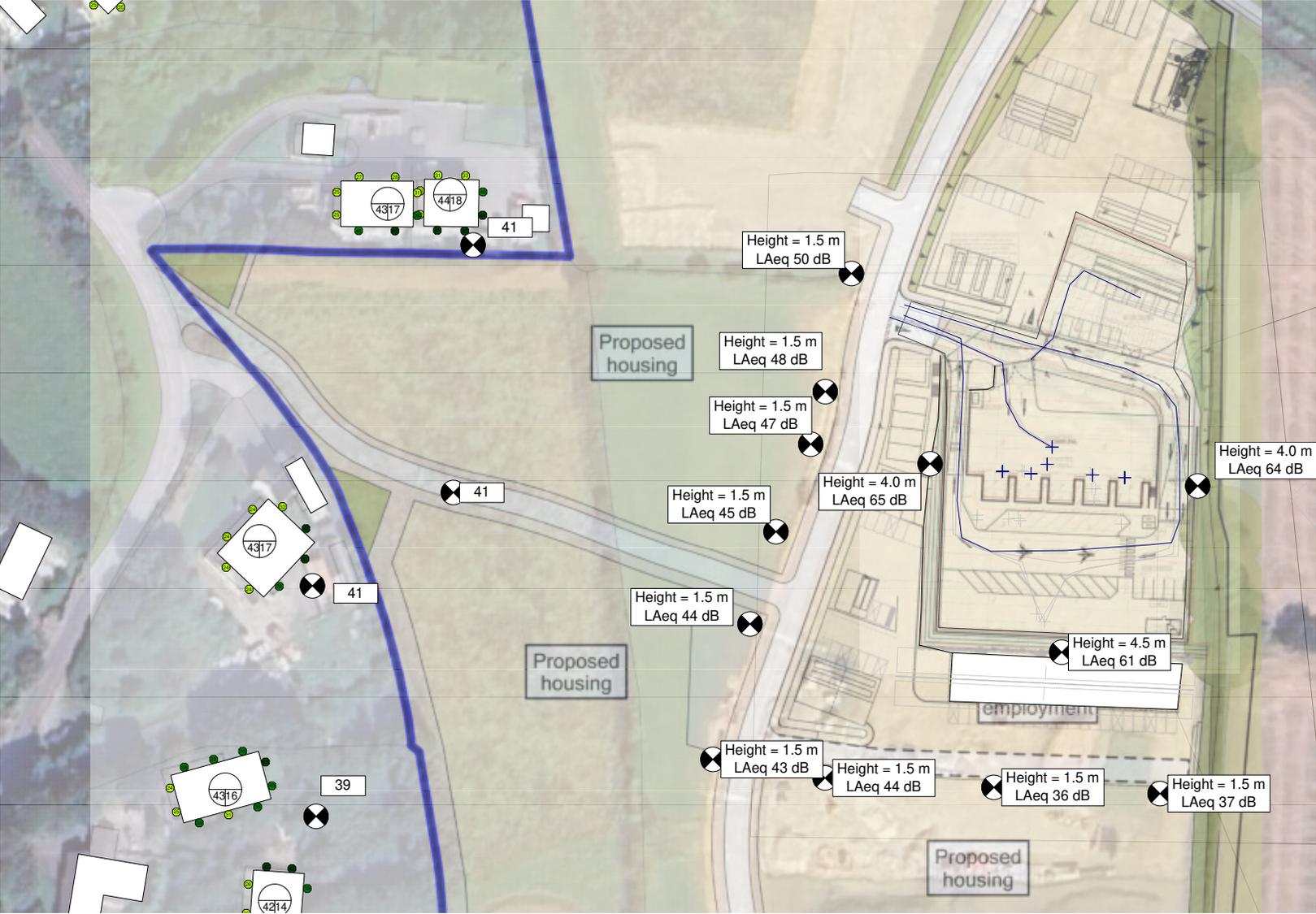
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Scale 1:1500@ A4

Key (dBA)

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- > 35.0 dBA
- > 40.0 dBA
- > 45.0 dBA
- > 50.0 dBA
- > 55.0 dBA
- > 60.0 dBA
- > 65.0 dBA
- > 70.0 dBA
- > 75.0 dBA
- > 80.0 dBA
- > 85.0 dBA



Clarke Saunders Associates

Newquay HWRC
 Predicted LAeq,1hr
 Noise Level

Pre-Opening
 Southern Bund
 Fence

Receptor Height:
 1.5m AGL

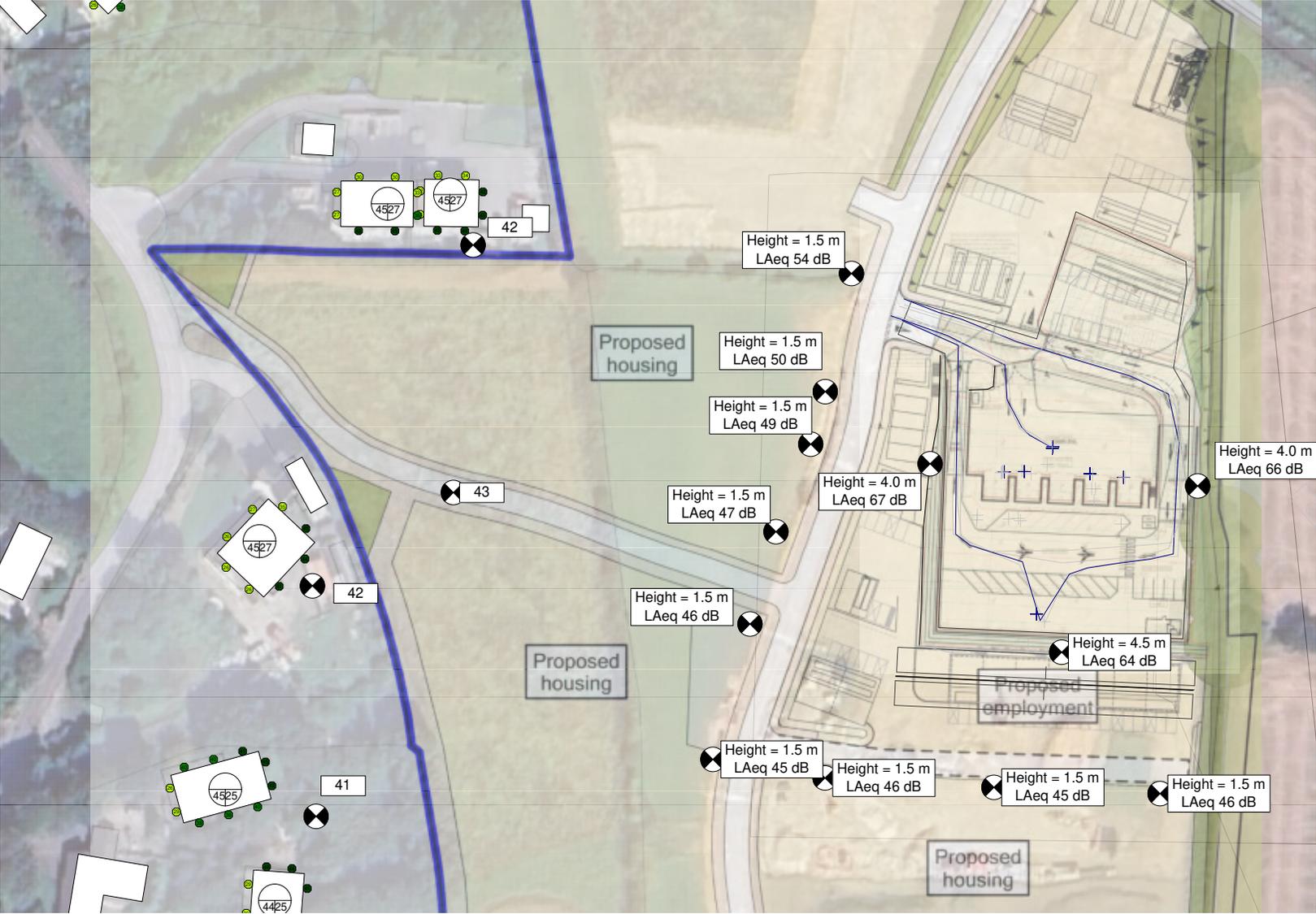
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- > 40.0 dBA
- > 45.0 dBA
- > 50.0 dBA
- > 55.0 dBA
- > 60.0 dBA
- > 65.0 dBA
- > 70.0 dBA
- > 75.0 dBA
- > 80.0 dBA
- > 85.0 dBA



Clarke Saunders Associates

Newquay HWRC
 Predicted LAeq,1hr
 Noise Level

Opening
 Southern Bund
 Fence

Receptor Height:
 1.5m AGL

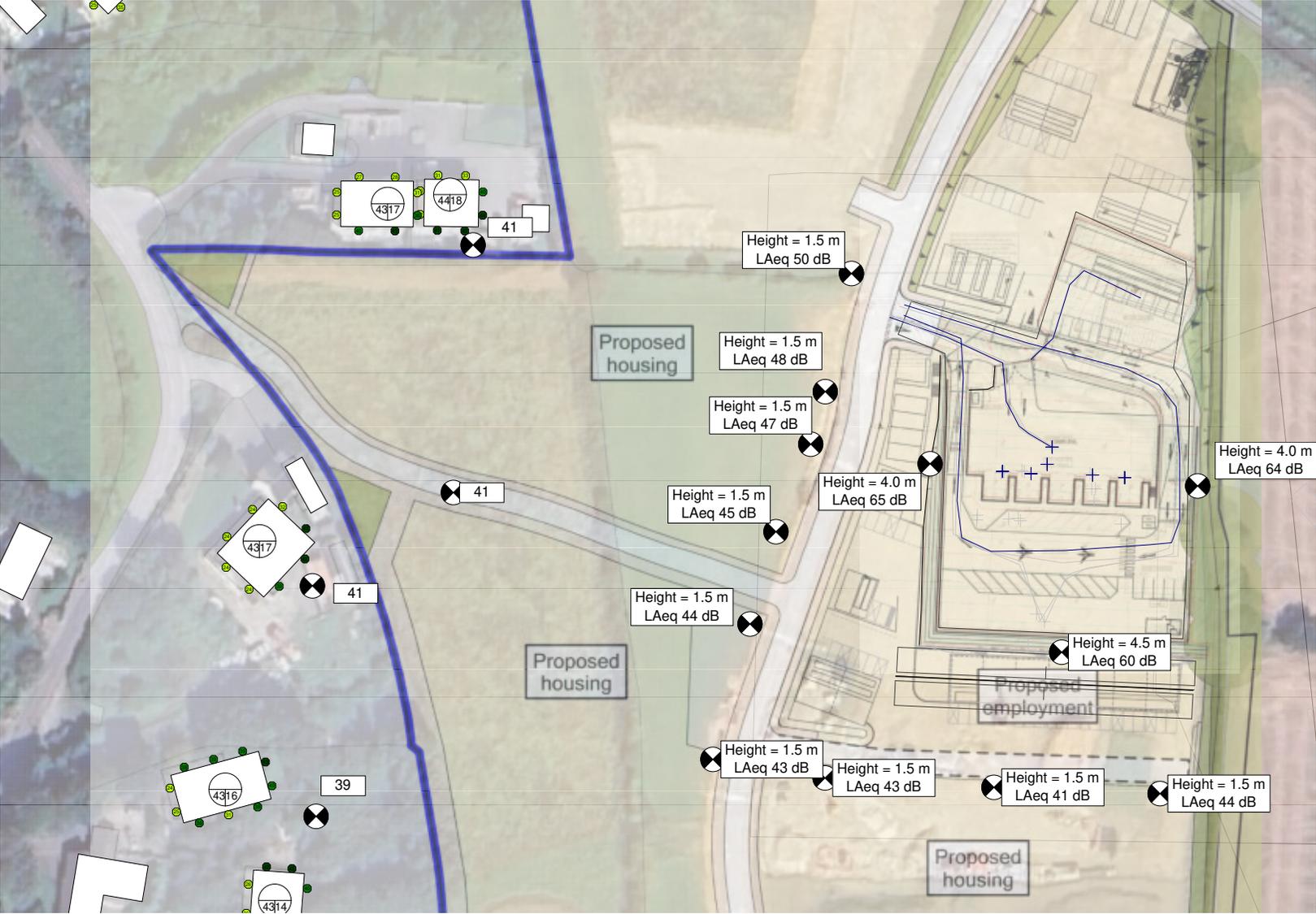
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Scale 1:1500@ A4

Key (dBA)

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- █ > 35.0 dB
- █ > 40.0 dB
- █ > 45.0 dB
- █ > 50.0 dB
- █ > 55.0 dB
- █ > 60.0 dB
- █ > 65.0 dB
- █ > 70.0 dB
- █ > 75.0 dB
- █ > 80.0 dB
- █ > 85.0 dB



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 *Noise Rating*. A single figure noise level rating that takes into account the frequency content of an acoustic environment.

R *Sound Reduction Index*. 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
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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

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.