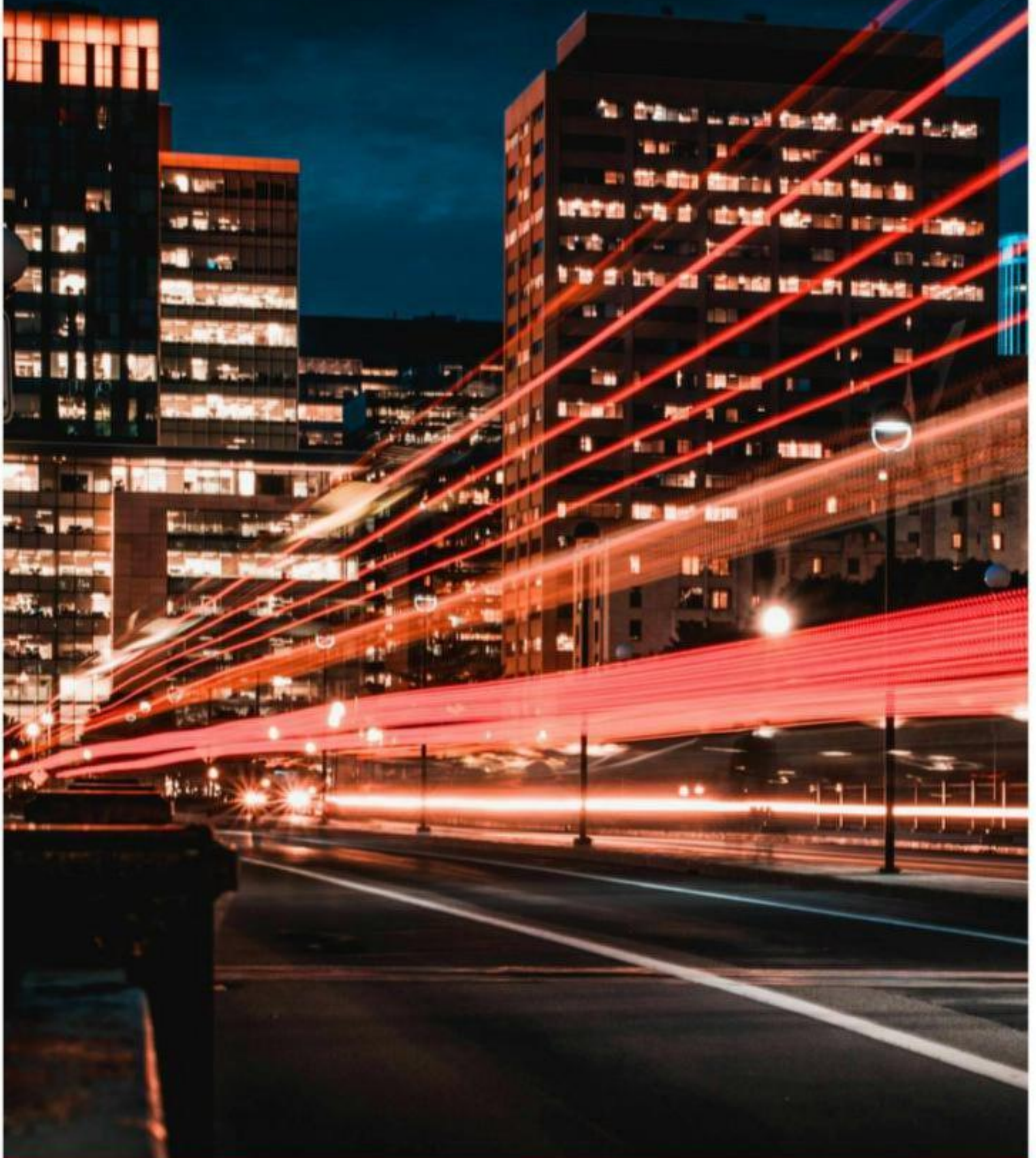




PREPARED: Wednesday, 03 July 2019

15-27 Horndean Road, Emsworth; Acoustic Design Statement (Stage 2)

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LIST OF ATTACHMENTS

AS11178/SP1	Indicative Site Plan
AS11178/TH1-TH4	Environmental Noise Time Histories
APPENDIX A	Acoustic Terminology Noise Report Audit Sheet Stage 1 Risk Assessment

Project Ref:	AS11178	Title:	15-27 Horndean Road, Emsworth
Report Ref:	AS11178.190617.ADS (Stage 2)	Title:	Acoustic Design Statement (Stage 2)
Client Name:	Metis Homes		
Project Manager:	Daniel Saunders		
Report Author:	Daniel Saunders		
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 Metis Homes proposes to develop land to the rear of Horndean Road, Emsworth PO10 7PT for a backland residential development of 16 plots.
- 1.2 A survey of the prevailing noise climate has been undertaken by Clarke Saunders Associates, commissioned by Metis Homes.
- 1.3 The initial Stage 1 Risk Assessment (appended to this report) identified the development area as **low-to-negligible risk** in terms of the significance of noise impact and indicated a requirement for consideration of appropriate site layout and design. This Stage 2 Acoustic Design Statement therefore considers the extent of this noise impact on the site in detail and any requirement for mitigation measures to address the risk identified.

2.0 ELEMENT 1 - ACOUSTIC DESIGN CONSIDERATIONS

- 2.1 The site lies next to Horndean Road but is not adversely affected by this in part due to distance loss and screening by existing residential properties, and in part due to the speed limit and traffic density of the road, with traffic volumes generally low.
- 2.2 The nearest arterial transport route is the A27 to the south at well over 200m to the nearest red line boundary as depicted on site plan AS11178.SP1.
- 2.3 Good acoustic design has been considered from the beginning of this proposal, including the following examples:
 - The south western most corner of the development site has been given over to open space;
 - The massing of building development naturally ensures that, further into the development (and generally, further south west across the site), dwelling facades and gardens will be increasingly screened from road noise from the principal noise source in the wider area;
 - Non-glazed building elements of suitable materials and mass have been proposed for dwellings across the site, where all facades are constructed from masonry, with casement double-glazed units;
 - Where possible, private external amenity spaces are orientated away from the A27.

3.0 ELEMENT 2 - INTERNAL NOISE LEVEL ASSESSMENT

- 3.1 The second element of the assessment is to seek to achieve recommended noise levels inside noise sensitive rooms in the new residential development.

3.2 PROPG INTERNAL NOISE LEVEL GUIDELINES

- 3.2.1 ProPG brings together relevant guidance from several sources including a British Standard (BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*) and internationally published guidance in the form of World Health Organisation *Guidelines for Community Noise* (1999). This is summarised in the following table.

ACTIVITY	LOCATION	07:00 TO 23:00	23:00 TO 07:00
Resting	Living Room	35 dB $L_{Aeq, 16 \text{ hour}}$	-
Dining	Dining Room	40 dB $L_{Aeq, 16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16 \text{ hour}}$	30 dB $L_{Aeq, 8 \text{ hour}}$

NOTE 1: The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2: The internal L_{Aeq} target levels shown in the Table 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 internal L_{Aeq} target levels recommended in the Table.

NOTE 3: These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

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. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).

NOTE 5: Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6: Attention is drawn to the requirements of the Building Regulations.

NOTE 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such

exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.D).

3.3 EXTERNAL BUILDING FABRIC SPECIFICATION & INTERNAL NOISE LEVEL ASSESSMENT

- 3.3.1 The following design review is based on the architectural drawings for the proposed construction and site layout available at the time of writing, targeting the internal noise levels set out in Section 3.2.1.

3.4 PRINCIPAL NOISE SOURCES AND PROPAGATION ACROSS SITE

- 3.4.1 The principal source of noise impact on the site is from road traffic on the A27, a speed restricted dual carriageway.
- 3.4.2 The nearest proposed dwelling will be approximately 300 meters from the central reservation of the dual carriageway. Due to the design of the development, this noise source will have a lower impact towards the south west of the site, and with the intermediate ground between the noise source and the development being soft (ie, having a high G-factor), further attenuation from absorption in addition to distance propagation will occur, as can be demonstrated in the resultant levels.

DAYTIME	NIGHT-TIME	TYPICAL NIGHT-TIME*
51 dB $L_{Aeq, 16 \text{ hour}}$	47 dB $L_{Aeq, 8 \text{ hour}}$	63 dB L_{AFMax}

- 3.4.3 Typical night-time L_{AFMax} levels are slightly above the 45dB guideline value as stated in ProPG;
- 3.4.4 As a contextual exercise, due to the location of the monitoring equipment, CSA have taken into consideration the propensity for morning birdsong and the dawn chorus to have influenced these L_{AFmax} measurements. Analysis shows that prior to 05:00 hours on each night of the survey there are less than 10 events above 60 dB L_{AFMax} that can be attributable to traffic related pass-by events. This is consistent with Note 4, Figure 2 ProPG Internal Noise Level Guidelines (additions to BS8233:2014);

In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times per night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events”.

- 3.4.5 Given that a partially open window affords a reduction of 15dB, daytime and night-time L_{Aeq} levels are within the internal target levels when including a 5dB relaxation that is applicable where, as stated in ProPG, “development is considered necessary and desirable”.

3.4.6 Noise levels across the site are such that "*reasonable internal conditions*" can be maintained. On all facades, noise levels are such that a natural ventilation strategy, via partially open windows would be appropriate. There should be at least 5000mm² equivalent area ventilation in each habitable room.

3.4.7 Compliance with other statutory requirements however, specifically Approved Document F, are likely to necessitate provision of background ventilation in any event.

3.4.8 A specification for glazing is provided in the following sections.

3.5 NON-GLAZED FAÇADE ELEMENT

3.5.1 It has been assumed that all non-glazed elements, i.e. masonry walls/facings and the roof systems, will provide the following minimum sound insulation performance of Rw51dB, when tested in accordance with ISO 10140-2:2010 and this is typically achievable with a traditional insulated brick and block external cavity wall.

3.6 GLAZING SPECIFICATION

3.6.1 The minimum sound insulation specifications for the glazed elements of the building façades are provided in the table below. These have been calculated using the site noise survey data to achieve the internal levels set out in Section 3.2.1.

3.6.2 Standard proprietary thermal double glazing (an indicative build-up of 4-12-4) will be suitable throughout the development to be below the "*target noise levels*". A non-acoustic performance rated trickle vent is also considered suitable.

3.6.3 Good acoustic design has been prioritised to limit noise levels in rooms on the more affected facades of the development.

3.6.4 Glazing units on these facades will still be openable and provide reasonable internal conditions as shown above, although, there is also no reason why windows could not be opened as a matter of personal preference or for purge ventilation. No internal noise criteria are specified for the purge scenario, during which the expulsion of odours and/or fumes such as burned toast or drying paint is the priority.

3.6.5 A detailed overheating study has not been conducted at this stage and would require the input of a third-party, competent specialist, if required.

3.6.6 The above analysis is based on controlling internal noise levels to the aspirational target criteria outlined in the ProPG.

3.6.7 It is important that the quoted sound reduction specifications are met by the panels and windows, including frames, seals, etc. Glazing performance alone is not an acceptable means of demonstrating compliance with the specification for window performance.

4.0 ELEMENT 3 - EXTERNAL AMENITY AREA NOISE ASSESSMENT

4.1 The ProPG makes it clear that consideration of noise in proposed external amenity areas is an important element in managing noise impact in new residential developments. The ProPG encourages a more holistic consideration of amenity than simply rating the level of noise outside.

PROPG EXTERNAL NOISE LEVEL GUIDELINES

4.3 ProPG states the following regarding the consideration and assessment of noise in external amenity spaces:

3(i) *"If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended".*

3(ii) *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB LAeq,16hr."*

3(iii) *"These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces."*

3(iv) *"Whether or not external amenity spaces are an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process."*

3(v) *"Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:*

- a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or*
- a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or*
- a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- a relatively quiet, protected, publicly accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations."*

4.4 EXTERNAL AMENITY SPACE NOISE ASSESSMENT - PROPOSALS

- 4.4.1 It is proposed that each plot on the site will feature external amenity areas; in addition, a large area of shared open space is provided to the south western extremity of the site. It is anticipated that the external amenity space of each individual plot will be separated by close boarded timber fencing, providing further attenuation.

4.5 EXTERNAL AMENITY SPACE NOISE ASSESSMENT - ANTICIPATED NOISE LEVELS

- 4.5.1 Existing measured daytime noise levels at site were $L_{Aeq,16hr}$ 51dB at the southern extremity of the site. This is approximately 10m from the perimeter of the nearest residential property to the A27, Plot 10.

4.5.2 Anticipated levels in the private external amenity areas are therefore largely be determined by (attenuated) contributions from the A27. Horndean Road to the north and east of the development does not significantly contribute to noise levels across the development site.

4.5.3 With additional distance loss from the monitoring position and any screening loss afforded by 1.8m close boarded timber fencing, levels in the private gardens of the proposed dwellings are expected to be at or below $L_{Aeq,16\text{-hour}}$ 50dB.

4.6 EXTERNAL AMENITY SPACE NOISE ASSESSMENT - DISCUSSION

4.6.1 The development features external amenity space to all properties where all residents can enjoy noise levels commensurate with the ProPG guidance range for enjoyment of external amenity.

4.6.2 In other shared external amenity spaces, noise levels are likely to be below the ideal range.

5.0 ELEMENT 4 - ASSESSMENT OF OTHER RELEVANT ISSUES

5.1 COMPLIANCE WITH RELEVANT NATIONAL AND LOCAL POLICY

5.1.1 National planning policy for England, set out in the Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF) and the ProPG, aims to promote the building of high quality sustainable homes in desirable areas whilst ensuring future and existing nearby residents and businesses are not adversely affected by the scheme (including by noise, amongst others).

5.1.2 The ProPG outlines a staged process by which to initially assess the risk posed by the existing noise climate followed by a more in-depth assessment of those risks and consideration of strategies by which they can be mitigated.

5.1.3 This assessment has demonstrated that through the use of good acoustic design, suitable mitigation measures, appropriate design of façade performance, layout of the site and internal layout of the dwellings, acceptable noise levels can be achieved both internally and externally.

5.2 COMPLIANCE WITH THE PROPG GUIDANCE

5.2.1 This assessment has demonstrated that whilst the acoustic environment at the development site is determined by road noise from the A27 to some degree, appropriate internal and external noise levels can still be achieved across the proposed scheme. The development therefore complies with the guidance of the ProPG.

5.3 PROPOSED OCCUPANCY

5.3.1 The scheme consists of 16 plots with intended occupancy anticipated to be families.

5.3.2 As such, it is appropriate that individual external amenity areas are provided for each dwelling. Given the small size, layout and purpose of the proposed development, future changes in types of occupancy are not anticipated. However, the proposed design would allow dwellings to be fit for further residential purpose, in line with the requirements of ProPG.

5.4 ACOUSTIC DESIGN VS. WIDER PLANNING OBJECTIVES

- 5.4.1 The acoustic design outlined in the report generally supports the wider planning objectives of providing necessary sheltered accommodation apartments in appropriate settings.

6.0 CONCLUSIONS

- 6.1 Measurements have been made of the prevailing noise climate at the proposed site for residential development at the currently unoccupied site on land to the rear of Horndean Road, Emsworth PO10 7PT.
- 6.2 The measured levels have been assessed against the National Planning Policy Framework and currently available standards and guidance documents including the Professional Practice Guidance on Planning and Noise, World Health Organisation *Guidelines for Community Noise (1999)* and BS8233:2014 *Guidance on Sound Insulation and Noise Reduction for Buildings*, to consider whether the site is suitable for its proposed residential use.
- 6.3 Good acoustic design has been considered throughout the planning stage, including careful attention to site layout, internal plot layout and glazing locations to ensure, wherever possible, maximum separation of habitable rooms from the A27 dual carriageway.
- 6.4 It is feasible to achieve the aspirational internal noise level guidelines in habitable rooms throughout the development using standard thermal double glazing throughout.
- 6.5 Noise levels across the site are such that occupants should be able to maintain appropriate reasonable internal noise levels with openable windows.
- 6.6 Private external amenity is provided for all dwellings and a large areas of communal green external amenity space are proposed to the south west of the proposed site. All occupants will also have access to quiet areas of on-site external amenity where noise levels are anticipated to be commensurate with the aspirational design range provided in the ProPG.



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CLARKE SAUNDERS ACOUSTICS

NOISE REPORT AUDIT SHEET

This initiative was developed by representatives of the Hampshire and IOW Environmental Control Advisory Committee (ECAC) and Institute of Acoustics Southern Branch. As part of this pilot initiative, Clarke Saunders is including this audit sheet for all planning related acoustic reports.

Client Brief

Brief Description	Proposed development of residential units adjacent to existing residential and playing fields north of the A27.
Design Input	Environmental noise survey to ascertain baseline levels for assessment. Acoustic design of the layout considered, and assessment of both internal and external noise levels.

Liaison with LA

Liaison with LA (Name/Date)	Havant Borough Council - None possible
Principles Agreed	The acoustic environment is reminiscent of many suburban areas, with little impact from the surrounding roads. No alternative method of assessment was considered necessary.

Check List	Page No(s)	Compliance		
		Y	N	N/A
Full site description/map provided	111/18/SP1	Y		
Site history provided	N/A			N/A
Current and potential future acoustic environment identified	2	Y		
Identification of relevant legislative framework	3	Y		
Conceptual model fully justified	N/A			N/A
Inclusion of reporting elements of BS4142:2014 (Para 12 a to j)	N/A			N/A
Monitoring data fully representative	111/18/TH1-5	Y		
Raw data presented	111/18/TH1-5	Y		
ADS included (where ProPG relevant)	111/18/W05	Y		
Calculations and assumptions fully presented and justified	N/A			N/A
Uncertainty assessment provided	N/A			N/A
Clear recommendations and conclusions	8	Y		
Executive summary included	1	Y		

Professional Statement - This report has been prepared independent of influence by the person(s) or instructing party, such that the technical content can be relied upon without knowingly containing altered, manipulated, fabricated or misrepresented data and it has been interpreted using reasonable care, professional knowledge and skill. 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 (including secondary author if relevant) 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.

Signed	Position	Dated
Dan Saunders	Director	03/07/2019



PREPARED: Monday, 03 June 2019

HORNDEAN ROAD, EMSWORTH: STAGE 1 RISK ASSESSMENT

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1.0	EXECUTIVE SUMMARY	2
2.0	INTRODUCTION	2
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4.0	ENVIRONMENTAL NOISE SURVEY	2
5.0	RESULTS	3
6.0	CONCLUSION	3

LIST OF ATTACHMENTS

AS11178.SP1	Indicative Site Plan
AS11178.TH1 - TH4	Environmental Noise Time Histories
APPENDIX A	Acoustic Terminology

Project Ref:	AS11178	Title:	Land rear of 15-27 Horndean Road, Emsworth
Report Ref:	AS11178.190522.RA	Title:	HORNDEAN ROAD, EMSWORTH: STAGE 1 RISK ASSESSMENT
Client Name:	METIS HOMES		
Project Manager:	DANIEL SAUNDERS		
Report Author:	DANIEL SAUNDERS		
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 Metis Homes proposes to develop land to the rear of Horndean Road, Emsworth PO10 7PT for a small residential development of approximately 10 plots.
- 1.2 A survey of the prevailing noise climate has been undertaken by Clarke Saunders Associates, commissioned by Metis Homes. A subsequent risk assessment following ProPG: Planning and Noise has shown there to be low to negligible risk. The ProPG recommends that a Stage 2 Acoustic Design Statement be prepared to consider the noise impact of the site in detail and to address the requirement for any outline measures as appropriate for the proposed residential development.
- 1.3 No further mitigation is considered necessary for appropriate external noise levels.

2.0 INTRODUCTION

- 2.1 Metis Homes proposes to develop land to the rear of Horndean Road, Emsworth PO10 7PT for a small residential development of approximately 10 plots.
- 2.2 Clarke Saunders Associates has been commissioned by Metis Homes to undertake an assessment of the current environmental noise impact on the site. Noise will be assessed in accordance with the National Planning Policy Framework, the recently published ProPG: Planning and Noise for new residential developments and with reference made to the relevant guidance set out in BS8233: 2014 *Guidance on sound Insulation and noise reduction for buildings*.
- 2.3 This report presents the results of the Stage 1 Risk Assessment which will be used to inform the requirement for a subsequent Stage 2 Acoustic Design Statement.

3.0 SITE DESCRIPTION

- 3.1 The site is bounded by residential properties to the north and east on Horndean Road. The nearest arterial transport route is the A27 to the south at approximately 200m to the nearest red line boundary as depicted on site plan AS11178.SP1.
- 3.2 The site is not adversely affected by road traffic noise from the surrounding roads due to the nature of these roads, speed limits, and distance from the proposed site.

4.0 ENVIRONMENTAL NOISE SURVEY

- 4.1 A survey of the existing ambient noise levels was undertaken. This was set to record measurements of consecutive 5-minute L_{Aeq} and L_{Amax} sound pressure levels between 12:00 on Thursday 23rd May and 10:55 on Tuesday 28th May 2019.
- 4.2 The following equipment was used during the course of the survey:
 - 1 no NTi sound level meter type XL2;
 - 1 no Rion sound level calibrator type NC74.
- 4.3 The calibration of the sound level meter was verified before and after use. No significant calibration drift was detected.

- 4.4 The weather during the survey was generally dry with light or little wind, which made the conditions suitable for the measurement of environmental noise. The sound level meter was installed to monitor a worst case scenario of the closest red line boundary to the nearest arterial transport route.
- 4.5 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*.
- 4.6 Please refer to Appendix A for details of the acoustic terminology used throughout this report.

5.0 RESULTS

- 5.1 Figure AS11178.TH1 - 4 shows the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories at the measurement positions.
- 5.2 The average noise levels for the 'Daytime' and 'Night-time' periods are shown below, as well as the typical L_{AFmax} , defined as the 90th percentile of the night-time L_{AFmax} dataset.

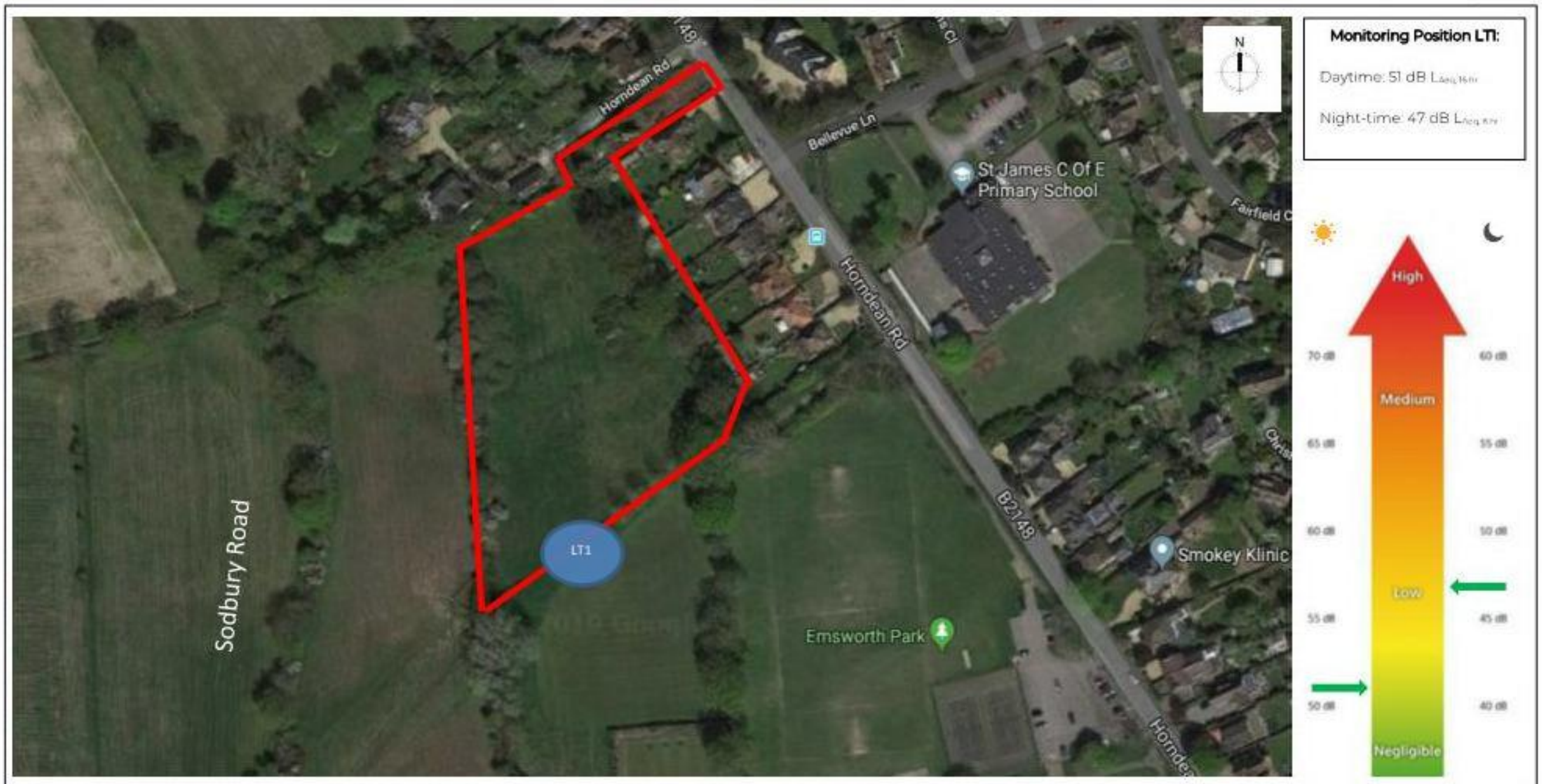
DAYTIME	NIGHT-TIME	TYPICAL NIGHT-TIME
51 dB $L_{Aeq, 16 \text{ hour}}$	47 dB $L_{Aeq, 8 \text{ hour}}$	63 dB L_{AFMax}

6.0 CONCLUSION

- 6.1 Clarke Saunders has undertaken a noise survey between Friday 24th May and Tuesday 28th May 2019 to ascertain the baseline daytime and night-time noise climate.
- 6.2 This Stage 1 Risk Assessment has identified the development area as a low-to-negligible risk in terms of noise impact. The ProPG recommends that a Stage 2 Acoustic Design Statement be prepared to consider the noise impact of the site in detail and to address the requirement for any outline mitigation measures as appropriate for the proposed residential development.
- 6.3 Acceptable levels of external residential amenity can be achieved without the need for further mitigation.



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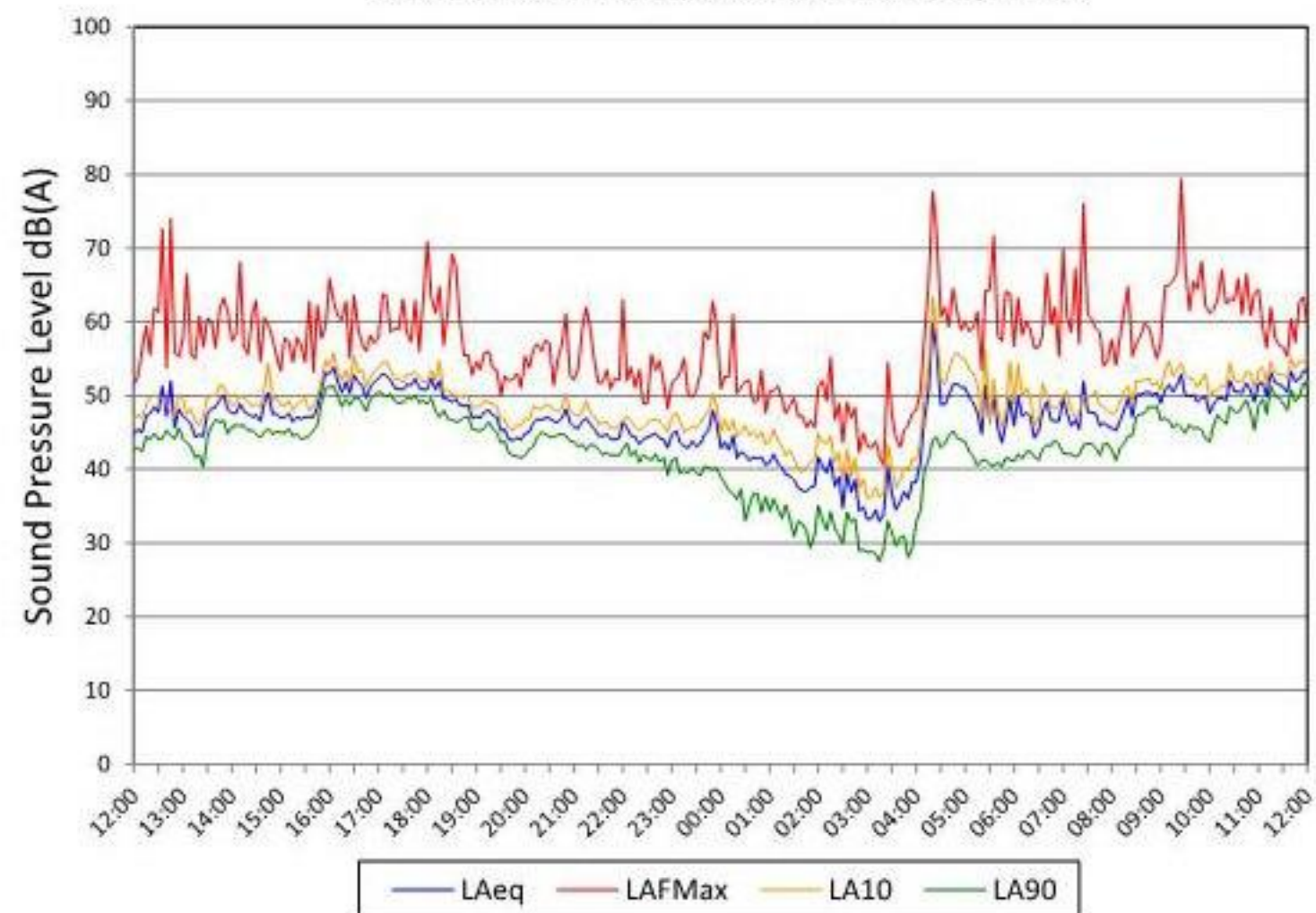
A survey of the existing noise climate was undertaken at position LT1 between Friday 24th May and Tuesday 28th May 2019.

The local roads do not have any specific adverse impact on the noise climate at the proposed site.

Noise levels are considered to represent a low-to-negligible risk.

Land rear of 15-27 Horndean Road, Emsworth

Environmental Noise Time History: LT1

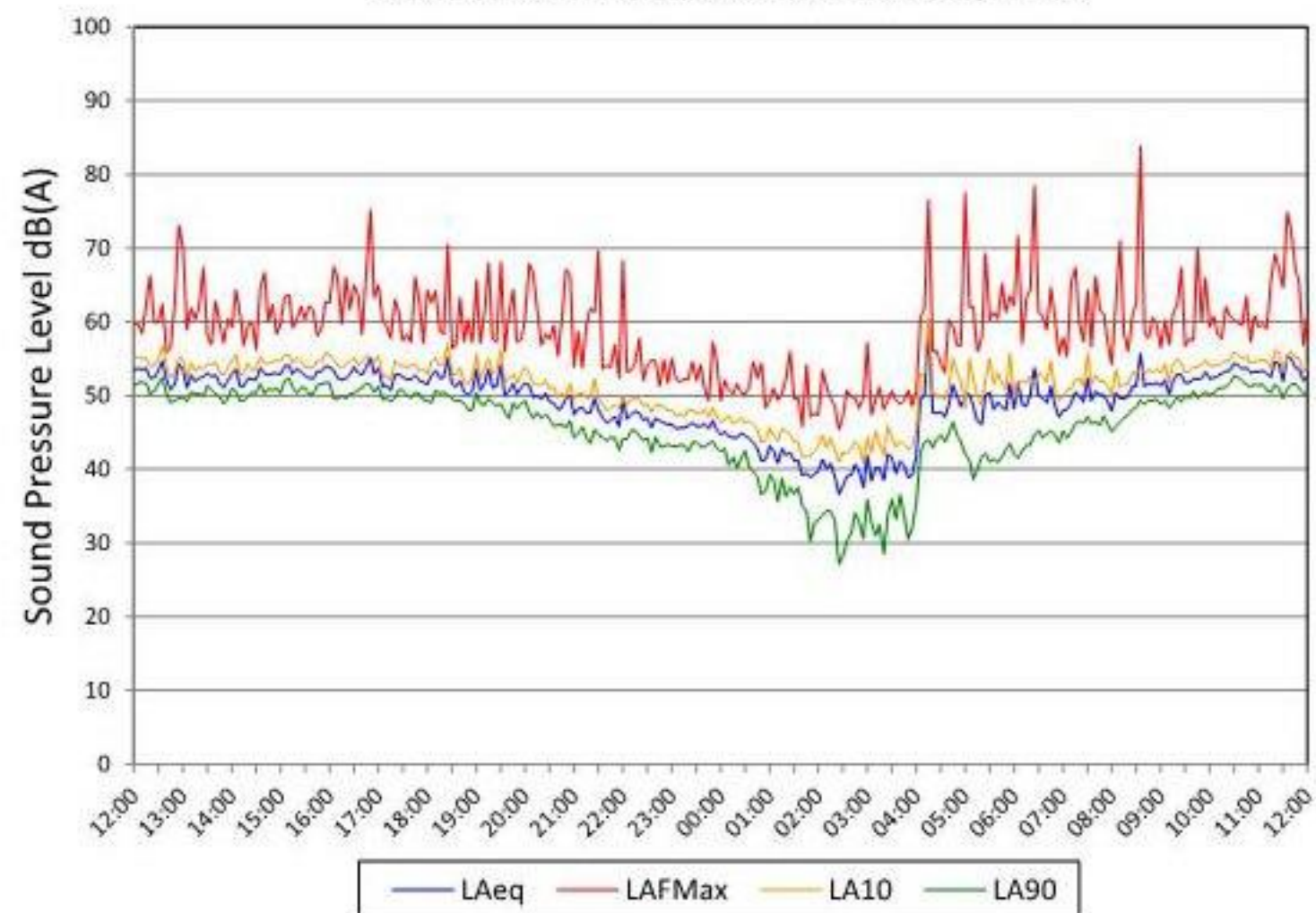


Friday 24 May to Saturday 25 May 2019

Figure AS11178/TH1

Land rear of 15-27 Horndean Road, Emsworth

Environmental Noise Time History: LT1

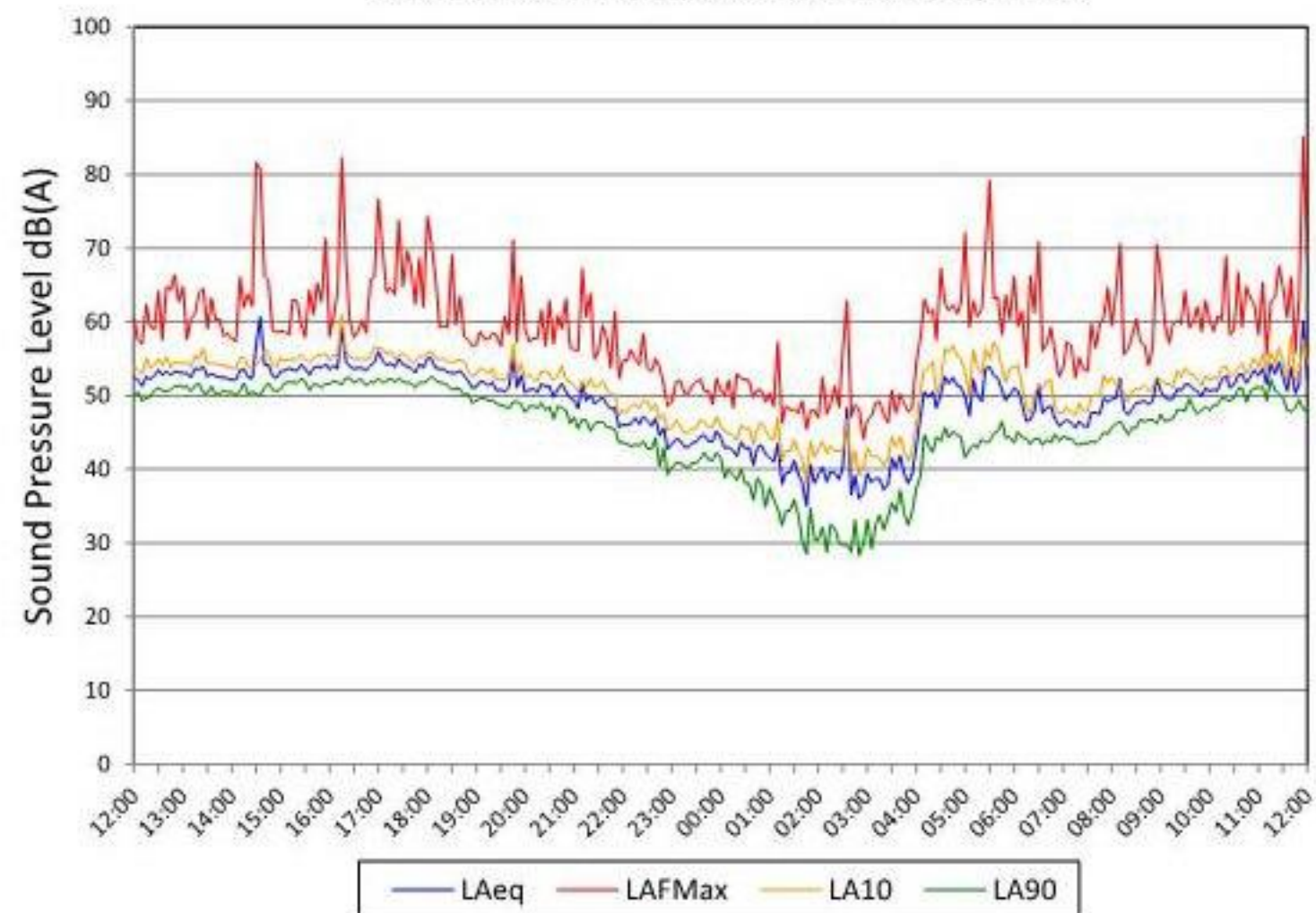


Saturday 25 May to Sunday 26 May 2019

Figure AS11178/TH2

Land rear of 15-27 Horndean Road, Emsworth

Environmental Noise Time History: LT1

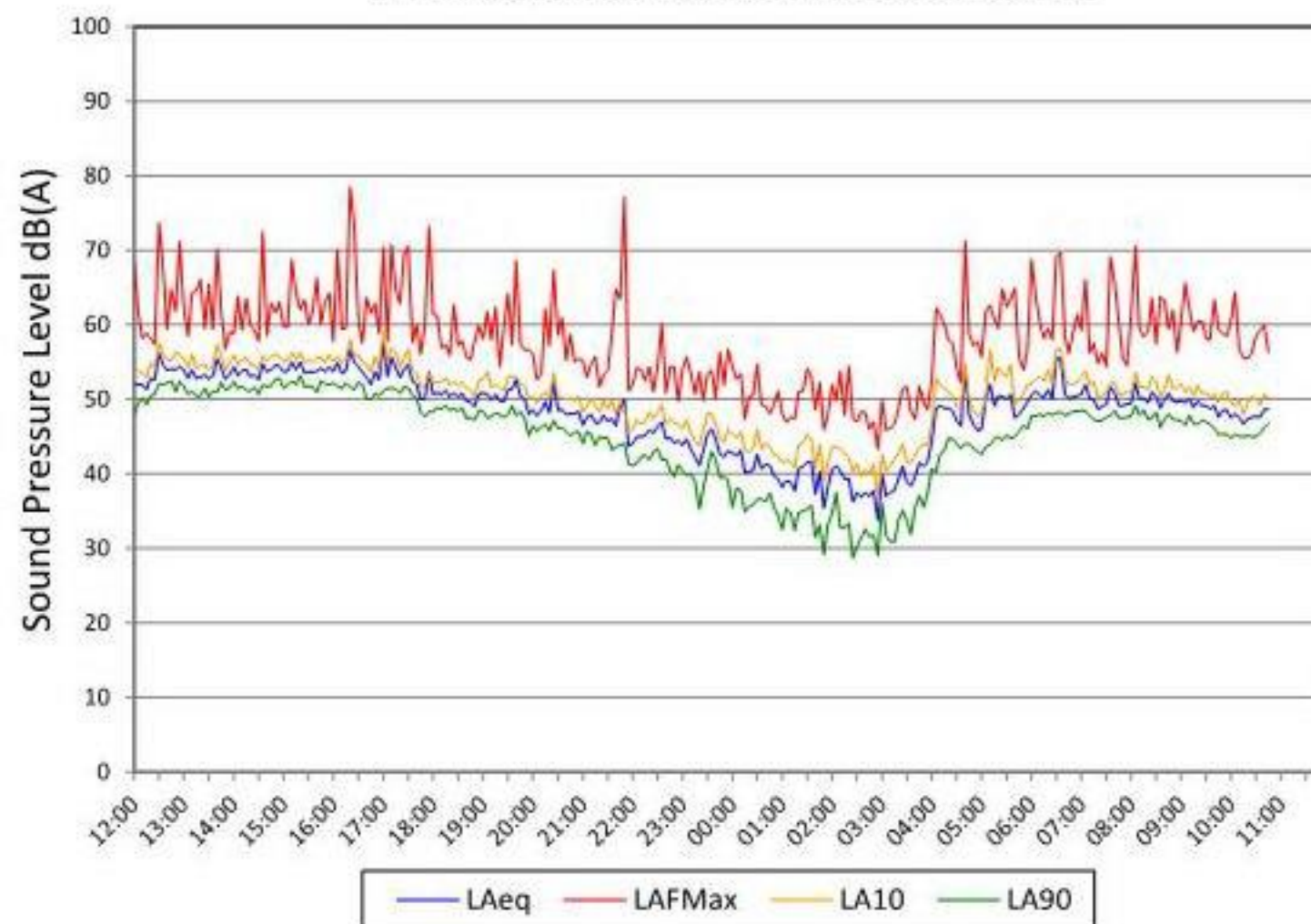


Sunday 26 May to Monday 27 May 2019

Figure AS11178/TH3

Land rear of 15-27 Horndean Road, Emsworth

Environmental Noise Time History: LT1



Monday 27 May to Tuesday 28 May 2019

Figure AS11178/TH4

1.1 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.

1.2 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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1.3 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

1.4 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.