Planning Noise Assessment

Penistone Road - Fenay Bridge

Stroma Built Environment Ltd.

SBE Ref: OPP-085016 AC 1v3

I. Revision History

<table>
<tr><th>Revision</th><th>Date</th><th colspan="2">Description</th></tr>
<tr><td rowspan="3">1v1</td><td rowspan="3">30/06/2022</td><td colspan="2">First Issue</td></tr>
<tr><td>Compiled By</td><td>Authorised By</td></tr>
<tr><td>Tom Chaffer MSc MIOA
Principal Acoustic Consultant</td><td>Andrew Gibson MEng MIOA
Principal Acoustic Consultant</td></tr>
<tr><td rowspan="3">1v2</td><td rowspan="3">08/07/2022</td><td colspan="2">Update to acoustic fencing assessment</td></tr>
<tr><td>Compiled By</td><td>Authorised By</td></tr>
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Principal Acoustic Consultant</td></tr>
<tr><td rowspan="3">1v3</td><td rowspan="3">11/07/2022</td><td colspan="2">Update to acoustic fencing assessment</td></tr>
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II. Executive Summary

Stroma Built Environment (SBE) has been appointed to undertake a planning stage noise assessment for a proposed residential development at Penistone Road, Fenay Bridge.

A baseline noise survey has been undertaken at the site over a representative period encompassing both a weekday and weekend to assess the prevailing noise climate at the site.

Measured noise levels have been used to inform the assessment of the minimum building envelope sound insulation requirements across the proposed development.

The recommended sound insulation performance of glazing and ventilators for the scheme is set out in Table 5 of this report. Noise levels in external amenity spaces across the development have also been considered.

Noise limits for external noise emission from items of fixed plant associated with the development have been proposed based on measured noise levels.

III. Contents

1. Introduction

1.1 Stroma Built Environment (SBE) has been appointed by Newett Homes (the client) to undertake a planning noise assessment in support of a proposed residential development at Penistone Road, Fenay Bridge, approximately 4km south east of Huddersfield.

1.2 It is understood that planning permission is being sought for the construction of up to 68 new residential dwellings, along with associated landscaping and access roads.

1.3 This document has been prepared for the sole use, benefit, and information of the client for the purposes set out, or instructions commissioning the works. The liability of SBE in respect of the information contained herein shall not extend to any third party.

1.4 This report is limited to addressing the specific issues described and is based on information and drawings provided. Whilst every effort has been made to ensure that this report is easy to understand, it is technical in nature. A glossary of terminology is included in Appendix III.

2. Site Baseline Conditions

Planning Guidance

IEMA Guidelines for Environmental Noise Assessment, 2014

2.1 The IEMA guidelines address the key principles of assessing noise effects and are applicable to all development proposals where noise effects may occur.

2.2 The guidance provides advice with regard to the collection of baseline noise data, prediction of noise levels and how noise should be assessed. The guidance recognises that the effect associated with a particular noise source will be dependent on a number of factors including, but not limited to the sensitivity of the receptor, the frequency and duration of the noise source and the time of day at which it occurs.

2.3 However, it stops short of providing specific assessment criteria which developments should achieve but instead suggests that the methodology adopted should be selected on a site by site basis with reference to relevant national and local standards.

BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

2.4 BS 8233 provides guidance for the control of noise in and around buildings. The guidelines recommend internal ambient noise criteria for a range of spaces. Relevant criteria to this development are presented as Table 1 below.

Table 1: BS 8233 Guideline noise levels for residential spaces

Activity	Location	Daytime dB $L_{Aeq, 16hr}$ (07:00-23:00)	Night Time dB $L_{Aeq,8hr}$ (23:00-07:00)
Resting	Living room	35	n/a
Dining	Dining room/area	40	n/a
Sleeping (daytime resting)	Bedroom	35	30

2.5 In addition, BS 8233 states:

2.6 *"Regular individual noise events (for example, scheduled aircraft of 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."*

ProPG: Planning & Noise Professional Practice Guidance in Planning & Noise (2017)

2.7 ProPG jointly published by the Institute of Acoustics (IOA), Acoustics and Noise Consultants (ANC) and the Chartered Institute of Environmental Health (CIEH) provides guidance for the assessment of noise affecting new residential developments. It draws on existing guidance including BS 8233 outlined previously.

2.8 In relation to maximum noise levels within dwellings, ProPG states:

2.9 *"In most circumstances in noise-sensitive rooms at night, (e.g. bedrooms) good acoustic design can be used so that individual events do not normally exceed 45 dB LAmax,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 factors such as the source, number, duration, predictability, and regularity of noise events."*

BS 4142: 2014 Methods for rating and assessing industrial and commercial sound +A1: 2019

2.10 BS 4142 describes a method for assessing the likelihood of complaints from noise sources that are of an industrial nature (e.g. fans, pumps, chillers, air handling units etc). The assessment methodology is based upon determining a 'rating level' for the equipment being assessed, which is the level of noise from the item or items of plant being assessed (measured as an $L_{Aeq,T}$).

2.11 The rating level is then compared with the underlying background noise level (measured as an L_{A90}) in the absence of noise from the item or items of plant being assessed.

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact depending on context.
- A difference of around +5 dB is likely to 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 the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.12 BS 4142 states that a penalty should be added for any plant which gives rise to noise features that may increase disturbance such as tonal, impulsive, or intermittent characteristics. With respect to the acoustic feature correction, BS 4142 States:

2.13 *"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."*

2.14 Generally a rating penalty for a sound should be based on a subjective assessment of its characteristics.

3. Baseline Noise Conditions

Site Summary

3.1 The proposed development site is located in Fenay Bridge, approximately 4km to the south east of Huddersfield. It is understood that site is currently in use as grazing/agricultural land.

3.2 The site lies approximately 20m west of Whitegates Grove, and descends sharply to the east towards the A629 Penistone Road. The site is bordered by hedgerows and mature trees and is surrounded to the north, east and south by residential dwellings. The western site boundary is adjacent to Penistone Road, and is bound by a low drystone wall. Beyond Penistone Road lies further open fields.

3.3 A site location plan is presented in Appendix II.

Baseline Conditions

3.4 A baseline noise survey was conducted at the site between Friday 16th and Monday 19th November 2018 to assess prevailing noise levels. Long term noise monitoring was undertaken at a height of approximately 3m above ground level, approximately 40m from the closest properties on Whitegates Grove. Long term noise monitoring was supplemented with additional short term noise measurements on the morning and afternoon of Friday 16th November. Short term monitoring was undertaken at the north west site boundary, approximately 10m from Penistone Road, at a height of 1.5m above ground level.

3.5 Noise levels were measured using UKAS calibrated NTi XL2 Class 1 precision integrating sound level meters. Calibration certificates for the meters are available on request. Noise was measured in terms of broadband A-weighted indices and spectral terms to assist with the design of noise control measures.

3.6 Figure 1 below presents the approximate noise monitoring locations.

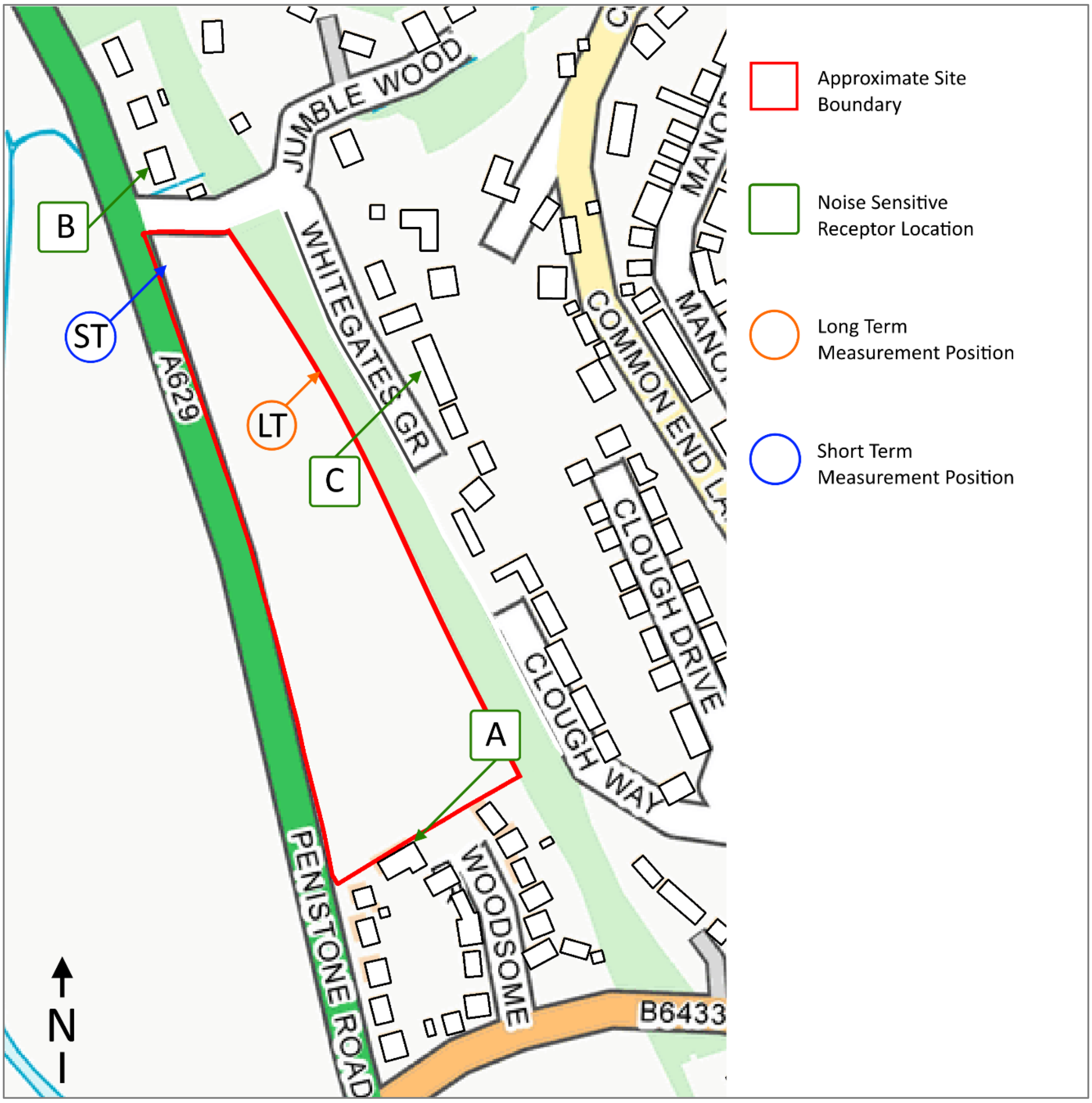


Figure 1: Noise monitoring positions

3.7 Noise levels across the site were found to be controlled by road traffic noise from Penistone Road, which runs parallel and adjacent to the western site boundary.

3.8 Table 2 below presents a summary of the baseline noise survey results, with detailed information presented as Appendix I.

Table 2: Noise survey summary results

Position	Period	Measured Sound Pressure level (dB)			
		$L_{Aeq,T}$[1]	$L_{Af,max}$[2]	$L_{Af,max}$ Range[3]	$L_{A90,T}$ [4]
LT	Daytime (07:00-23:00)	62	-	-	55
	Night (23:00-07:00)	55	65	56-76	27
ST	Night (05:15-07:00)	69	83	45-87	50
	Early Morning (07:00-09:00)	73	-	-	64
	Daytime (10:15-12:20)	72	-	-	62

Notes to Table 2:
[1] Logarithmic average over stated period
[2] 90th Percentile of 1-minute $L_{AF,max}$ presented for stated period.
[3] Range of 1-minute $L_{AF,max}$ presented for stated period.
[4] Arithmetic average over stated period.

Noise Sensitive Receptors

3.9 The closest noise sensitive receptors (NSR's) to the development are considered to be residential dwellings to the north east and south of the site. These are identified on Figure 1 and described in Table 3 below.

Table 3: Identified Noise Sensitive Receptors

NSR	Description	Approximate Distance to Site Boundary
A	Residential dwellings at Woodsome Drive	10m
B	Residential dwellings at 49 Penistone Road	25m
C	Residential dwellings along Whitegates Grove	25m

4. Noise Impact Assessment

4.1 Based on measured noise levels summarised in Section 3, a three dimensional Cadna-A noise model has been developed to predict noise levels across the proposed development site. The noise model considers noise emission from road traffic along Penistone Road. The model geometry is based on Ordnance Survey mapping and digital terrain modelling, whilst geometry for the development site is based on drawings supplied by the client (drawing ref: Z078-001 Rev C Planning Layout). Site levels and retaining walls to the west of the scheme have been included in the noise model as shown in drawing Z078-001 Rev B Planning Layout, Noise propagation has been calculated according to ISO 9613: 1996.

4.2 It should be noted that the noise model assumes the existing topography of the site is retained. It is likely that some levelling of the site will occur as part of the development, which may affect the amount of screening across the development.

4.3 The noise model has been used to predict noise levels across the proposed development. Figures A3 and A4 in Appendix II present the predicted day and night time façade noise levels at first floor level, whilst Figure A5 presents a daytime noise contour plot calculated at 1.5m above ground level.

4.4 During the daytime, noise levels at the most exposed westerly façades of properties overlooking Penistone Road are predicted to be ≤ 71 dB $L_{\text{Aeq, 16hr}}$, with night time levels of ≤ 67 dB $L_{\text{Aeq, 8hr}}$. Less exposed facades across the development at distances greater than 33m from the western site boundary are predicted to be subject to noise levels of ≤ 64dB $L_{\text{Aeq, 16hr}}$ during the day, and ≤ 59 dB $L_{\text{Aeq, 8 hr}}$ during the night time. Note that these levels are based on the results of both the long term and short term measurements between 05:15 and 07:00, and are representative of the likely noise impact during the loudest periods of the day and the night time.

4.5 Maximum noise levels for the most exposed façades have been derived from the short term measurement position between 05:15 and 07:00 on Friday, where maximum noise levels were generally ≤ 83 dB $L_{\text{Af,max}}$ based on 1 minute sampling periods.

Background Ventilation

4.6 At this stage in the development, the proposed ventilation strategy for the development has not been confirmed. Therefore, it has been assumed that dwellings will be ventilated by passive means via trickle ventilators or similar.

4.7 Based on measured noise levels, the use of passive trickle ventilators in façades or windows is expected to be suitable across the site. Ventilators should be selected to provide sufficient sound insulation to external noise such that the IANL criteria outlined in section 2 can be achieved in habitable rooms with the ventilator in the open position.

Purge (Intermittent) Ventilation

4.8 Approved Document Part F requires that intermittent rapid ventilation is supplied for occupants to quickly expel fumes from dwellings, such as those from burning toast.

4.9 The use of opening windows is expected to be acceptable for short term use in the basis that the effect of increased internal noise levels would be expected by the occupant, and that the relative exposure would be small.

Mitigation of Overheating

4.10 Due to the energy efficiencies required from modern buildings (as a result of Approved Document Part L) including high levels of air-tightness, dwellings can be prone to solar gain and/or heat gain from internally located sources. Rapid ventilation rates are therefore often required in order to provide relief from the effects of summer overheating.

4.11 Should an open window strategy for mitigating overheating be adopted, the sound insulation performance of the façade would reduce to approximately 10 – 15 dB.

4.12 The acceptability of such an approach would depend on the duration, times, and the frequency when open windows would be required, and is outside the scope of this report. Such an assessment should be informed by an overheating assessment with regard to the wider planning context including the economic and social benefits otherwise derived from the development.

4.13 Table 4 below has been extracted from the Association of Noise Consultants' (ANC) *Acoustics Ventilation and Overheating Guide* and details the derived level of risk to the client on this development on the basis of SBE' measured external noise levels and an open windows strategy.

Table 4: Assessment of outcomes due to an open window rapid ventilation strategy

Internal ambient noise level		Examples of outcomes	Risk category
Average day noise level, $L_{Aeq,T}$ 07:00-23:00	Average night noise level, $L_{Aeq,T}$ 23:00-07:00		
≤ 35 dB	≤ 30 dB	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	Negligible
> 35 dB and ≤ 40 dB	> 30 dB and ≤ 35 dB	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in the quality of life.	Low
> 40 dB and ≤ 50 dB	> 35 dB and ≤ 43 dB	Increasing risk of adverse effect due to impact on reliable speech communication during daytime or sleep disturbance at night. Although noise levels at the lower end of this category will cause changes in behaviour, they may still be considered suitable. Noise levels at the upper end of this category will result in more significant changes in behaviour and are only likely to be considered suitable if they occur for limited periods.	Medium
> 50 dB	> 43 dB	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	High

Building Envelope Sound Insulation Requirements

4.14 Indicative noise ingress calculations have been undertaken according to the methodology outlined in Annex G of BS 8233: 2014 to provide guidance on the minimum sound insulation requirements in order to achieve the Indoor Ambient Noise Level (IANL) guidelines summarised in Section 2.

4.15 At this stage in the development, the locations and layouts of individual properties is subject to change, therefore calculations have been undertaken for bedrooms based on indicative façade dimensions of $9m^2$, with up to $2m^2$ of glazing. Allowance has been made for one trickle ventilator per bedroom and two ventilators to living rooms. Should this number be increased, the specification of each ventilator may need to be reviewed to ensure the IANL is maintained.

4.16 For the purposes of this assessment, the solid portion of the building envelope of the new build has been calculated based on a typical masonry build-up having a sound insulation performance of ≥ 45 dB $R_w + C_{tr}$.

4.17 Noise break-in via the roofs of proposed dwellings has also been assessed. Installation of a traditional roof utilising exterior tiles on a timber frame with mineral wool insulation in the void and a 25mm plasterboard ceiling will provide adequate noise control.

4.18 Table 5 presents the results of the calculations and should be read in conjunction with Figures A3 and A4 Note that where there are differing specifications on a given façade for either the day or night time periods, the higher of the two specifications would apply for the relevant habitable spaces.

Table 5: Facade sound insulation recommendations

Façade Noise level	Façade Recommendations
Blue	Bedrooms: • Acoustic glazing having a sound insulation performance of ≥ 36 dB $R_w + C_{tr}$ • Attenuating acoustic ventilators having a sound insulation performance of ≥ 45 dB $D_{n,e,w} + C_{tr}$ Living Rooms • Standard Thermal double glazing having a sound insulation performance of ≥ 35 dB $R_w + C_{tr}$ • Attenuating acoustic ventilators having a sound insulation performance of ≥ 45 dB $D_{n,e,w} + C_{tr}$
Orange	All habitable Rooms: • Standard Thermal double glazing having a sound insulation performance of ≥ 27 dB $R_w + C_{tr}$ • Attenuating acoustic ventilators having a sound insulation performance of ≥ 39 dB $D_{n,e,w} + C_{tr}$
Yellow	All habitable Rooms: • Standard Thermal double glazing having a sound insulation performance of ≥ 28 dB $R_w + C_{tr}$ • Attenuating acoustic ventilators having a sound insulation performance of ≥ 33 dB $D_{n,e,w} + C_{tr}$
Green	All habitable Rooms: • Standard Thermal double glazing having a sound insulation performance of ≥ 28 dB $R_w + C_{tr}$ • Attenuating acoustic ventilators having a sound insulation performance of ≥ 28 dB $D_{n,e,w} + C_{tr}$
Dark Green	All habitable Rooms: • Standard Thermal double glazing having a sound insulation performance of ≥ 28 dB $R_w + C_{tr}$ • Façade ventilators with no acoustic rating

4.19 The minimum $D_{n,e,w} + C_{tr}$ sound insulation performance of any ventilators selected should be confirmed prior to use to ensure that the IANL criteria are satisfied, having account of the number of ventilators for a given space, noting that the overall sound insulation performance of the façade is reduced for multiple ventilators relative to the performance of a single unit.

4.20 It should be noted that sound insulation requirements are inclusive of a C_{tr} correction, a spectral adaptation term applied to account for the effects of low frequency urban traffic noise. This should be taken into account when selecting suitable glazing.

4.21 It should also be noted that the calculations given above are indicative only, and are based on the stated room dimensions. Detailed calculations may be undertaken once the proposed scheme layout and façade design have been developed to demonstrate that the indoor noise criteria are satisfied.

External Amenity Areas

4.22 The assessment of external amenity areas across the site has been undertaken having regard to the BS 8233 which states:

4.23 *"For traditional external areas that are used for amenity space, such as gardens or patios it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,}$ T, with an upper guideline value of 55 dB $L_{Aeq,}$ T which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."*

4.24 Figure A5 presents a daytime noise contour at a height of 1.5m to represent noise levels in amenity areas. To the east of the site where noise from road transport noise sources is reduced due to the screening of road noise provided by the proposed new buildings, noise levels are predicted to be ≤ 55dB $L_{Aeq,\ 16hr}$. Based on these levels, these areas are considered suitable for use without mitigation.

4.25 Dwellings located closest to the western site boundary with garden areas not screened by buildings will be exposed to higher amenity noise levels. It is predicted that external noise levels would be up to 67 dB $L_{Aeq,\ 16hr}$ in the most exposed garden areas. For these areas, mitigation could be employed such as enhanced acoustic fencing to provide localised screening for gardens.

4.26 To assess noise levels in gardens of the worst affected properties (Plots 1-4, 17, 36-38 and Plots 41-42), a barrier replicating closed boarded timber fencing with minimum height 2.0m with a mass per unit area of ≥ 10 kg/m^2 has been modelled. Under this scenario, noise in gardens of properties close to Penistone Road are predicted to be typically ≤ 57 dB $L_{Aeq, 16hr}$, approximately 10 dB lower than levels predicted without boundary fencing.

4.27 Figure A6 in Appendix II provides a visual representation of the improved acoustic amenity from road noise with the incorporation of acoustic screening as indicated in the figure. All other garden fencing is assumed to be standard timber fencing of approximately 1.8m height Due to the site location, and site layout, which we understand is the preferred site layout agreed with the Planning Authority, other than the incorporation of the acoustic screening, we do not believe there are any other practical measures which can be incorporated to reduce traffic noise levels further in the external amenity spaces.

4.28 Where acoustic fencing is proposed it should be constructed of a solid material with a mass per unit area of ≥ 10 kg/m^2 and must extend to the ground with no gaps. Brick or dense timber fencing, or a mix of the two approaches is suitable.

5. Fixed Plant Noise Limits

5.1 At this stage in the development, details of items of fixed plant which may be installed are not available. As such, plant noise limits have been determined based on measured background noise levels summarised in Section 3, and the guidance outlined in Section 2.

5.2 A rating noise limit not exceeding the existing representative background noise level for either the day or the night time has been proposed based on the guidance in BS 4142 which states:

"Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

5.3 Table 6 presents the proposed rating noise limits based on an assessment of the representative background sound level for daytime and night time periods. Daytime site noise levels are elevated by traffic noise, therefore evening data between 19:00 and 23:00 hours has been used to establish a typical background sound level.

Table 6: Proposed rating noise limits

NSR	Period	Representative background noise level (dB $L_{A90,T}$)	Proposed rating noise level (dB $L_{Ar,Tr}$)
All NSR's	Daytime (07:00-23:00)	44	44
	Night Time (23:00-07:00)	27	27

6. Conclusions

6.1 Stroma Built Environment has been appointed to undertake a planning stage noise assessment for a proposed residential development at Penistone Road, Fenay Bridge.

6.2 A baseline noise survey has been undertaken at the site over a representative period to assess the prevailing noise climate at the existing unoccupied site.

6.3 A three dimensional noise model of the proposed new development has been created based on the results of SBE's baseline noise survey, and used to predict noise levels at the façade of proposed dwellings across the development.

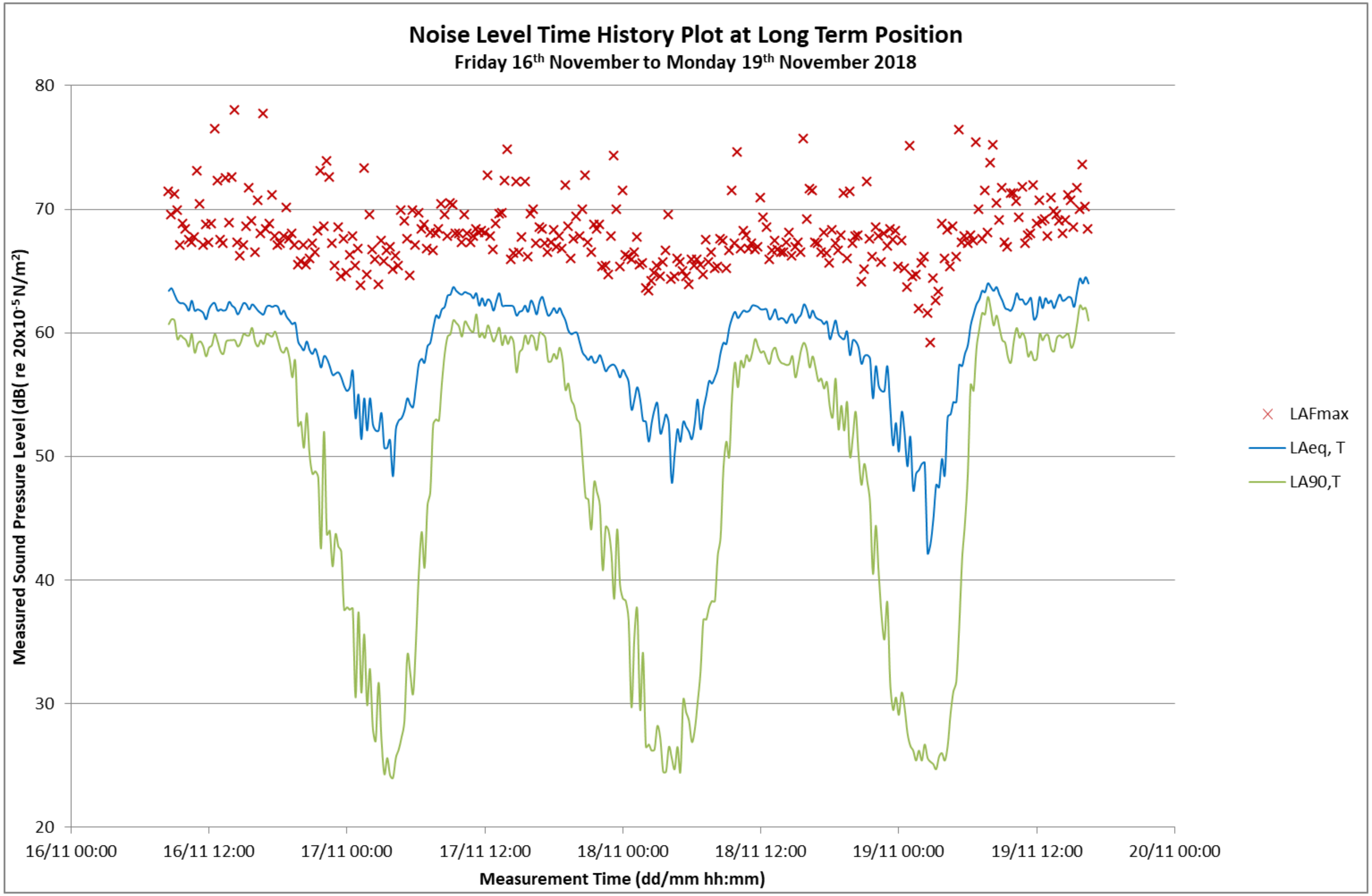
6.4 The calculated noise levels have informed the proposed ventilation and façade insulation strategy for habitable rooms within the development, having regard to relevant guidance. Consideration is also given to noise levels in external amenity areas.

6.5 At this stage, details regarding the location and number of items of fixed plant which may be installed as part of the development are not available. Therefore noise limits for external noise emissions have been proposed based on SBE's measured noise levels, and having regard to relevant guidance.

Appendix I. Survey Information and Data

Short term monitoring position

Start Time	Duration	Measured Sound Pressure Level		
		$L_{AF,max}$	$L_{Aeq,T}$	$L_{A90,T}$
16/11/2018 05:15	0:13:08	84.0	66.0	45.6
16/11/2018 05:30	0:15:00	83.7	66.7	46.4
16/11/2018 05:45	0:15:00	87.2	68.6	51.9
16/11/2018 06:00	0:15:00	84.0	68.4	47.5
16/11/2018 06:15	0:15:00	84.3	69.6	52.4
16/11/2018 06:30	0:15:00	84.2	70.8	57.3
16/11/2018 06:45	0:15:00	84.4	71.3	59.2
16/11/2018 07:00	0:15:00	82.0	71.8	61.7
16/11/2018 07:15	0:15:00	81.3	72.3	63.0
16/11/2018 07:30	0:15:00	83.8	72.6	66.7
16/11/2018 07:45	0:15:00	89.5	72.6	65.5
16/11/2018 08:00	0:15:00	84.7	73.3	64.9
16/11/2018 08:15	0:15:00	83.2	72.8	65.1
16/11/2018 08:30	0:15:00	83.9	73.1	64.4
16/11/2018 08:45	0:15:00	81.8	72.9	64.2
16/11/2018 10:15	0:04:19	81.8	71.6	62.1
16/11/2018 10:30	0:15:00	85.4	72.3	64.8
16/11/2018 10:45	0:15:00	82.9	72.0	63.1
16/11/2018 11:00	0:15:00	84.4	72.1	60.0
16/11/2018 11:15	0:15:00	82.4	72.0	64.0
16/11/2018 11:30	0:15:00	81.4	71.9	62.3
16/11/2018 11:45	0:15:00	83.0	71.8	61.1
16/11/2018 12:00	0:15:00	84.5	72.4	62.3
16/11/2018 12:15	0:14:00	85.3	72.5	62.3


Noise Level Time History Plot at Long Term Position
Friday 16th November to Monday 19th November 2018
80
70
60
50
40
30
20
Measured Sound Pressure Level (dB(re 20x10-5 N/m2)
16/11 00:00
16/11 12:00
17/11 00:00
17/11 12:00
18/11 00:00
18/11 12:00
19/11 00:00
19/11 12:00
20/11 00:00
Measurement Time (dd/mm hh:mm)
LAFmax
LAeq, T
LA90,T

Appendix II. Figures

ACCOMMODATION SCHEDULE

Market Units

Colour Code	Housetype		Beds		Storey Height	Number	2 Bed %
	N201	Elm	2	Semi	2	11	
	T3		3	Semi	2	4	
	Total					15	22%

Colour Code	Housetype		Beds		Storey Height	Number	3 Bed %
	N302	Blackthorn	3	Detached	2	10	
	N303A	Laurel	3	Semi	2	4	
	SL03	Beeches	3	Semi	3	10	
	SL04	Rowan	3	Semi	3	6	
	N313	Aspen	3	Semi	2.5	4	
	Total					34	50%

Colour Code	Housetype		Beds		Storey Height	Number	4 Bed %
	N402	Mulberry	4	Detached Integral	2	1	
	N403A	Willow	4	Detached	2	1	
	N403B(s)	Willow Alt	4	Detached	2	5	
	N405	Cedar	4	Detached Integral	2	3	
	N407	Woodlark	4	Detached	2	1	
	SL02	SL02	4	Detached	3	8	
	Total					19	28%

GRAND TOTAL	Number
	68

Drawing Title
Planning Layout

Site
Penistone Road, Fenay Bridge

Scale @ A2 1:1000 Date 14/06/22

Drawn MC Checked WN

Drawing No. Z078-001 Rev. C

Thorpe Arch Grange
Walton Road
Thorp Arch
LS23 7BA

01937 543599
www.newetthomes.co.uk

Figure A1: Proposed site layout

ACCOMMODATION SCHEDULE

Market Units

Housetype		Beds		Storey Height	Number	3 Bed %
N302	Blackthorn	3	Detached	2	10	
N303A	Laurel	3	Semi	2	4	
SL03	Beeches	3	Semi	3	10	
SL04	Rowan	3	Semi	3	6	
N313	Aspen	3	Semi	2.5	6	
Total					36	64%

Housetype		Beds		Storey Height	Number	4 Bed %
N402	Mulberry	4	Detached Integral	2	1	
N403A	Willow	4	Detached	2	2	
N403B(s)	Willow Alt	4	Detached	2	5	
N405	Cedar	4	Detached Integral	2	3	
SL02	SL02	4	Detached	3	8	
Total					19	36%
Sub-total					53	78%

Affordable Units						
Housetype		Beds		Storey Height	Number	
A2		2	Semi	2	11	
A3		3	Semi	2	4	
Total					15	22%

Figure A2: Proposed site levels and retaining walls

Figure A3: Daytime predicted façade noise levels

Figure A4: Night time predicted façade noise levels

Figure A5 Daytime predicted noise contour plot

Figure A6 Daytime predicted noise contour plot (inclusive of partial boundary fencing)

Appendix III. Acoustic Glossary

Sound pressure level and the decibel, dB

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. The decibel is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Frequency and hertz, Hz

Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz. The human range of hearing is commonly accepted to be 20 Hz to 20,000 Hz. Additionally, an octave can be used to describe the interval between a frequency in Hz and either half or double that frequency.

Frequency weighting

Different weighting networks can be applied to a given sound level in each stated octave band by a specified amount, in order to better represent the response of the human ear. The most commonly used weighting network is the ‘A’ weighting, and the letter ‘A’ will be included within a descriptor to indicate that the value has been ‘A’ weighted, e.g. $L_{\mathrm{Aeq},T}$ or L_{A90}. An ‘A’ weighted noise level may also be written as dB(A). Other weightings less commonly used are ‘C’ and ‘D’ weighting.

Noise indices

When a noise level varies with time, the measured ‘A’ weighted dB level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple ‘A’ weighted dB value. In order to describe noise where the level is continuously varying, a number of other indices, including statistical parameters, are used. The various indices used are described as below:

$L_{\mathrm{Aeq},T}$	The ‘A’ weighted ‘equivalent continuous noise level’ which is an average of the total sound energy measured over a specified time period, *T*
L_{Amax}	The maximum ‘A’ weighted noise level that was recorded during the monitoring period.
L_{A10}	The ‘A’ weighted noise level that was recorded for at least 10% of the monitoring period.
L_{A90}	The ‘A’ weighted noise level that was recorded for at least 90% of the monitoring period, usually taken as the underlying ‘background’ noise level.

Sound level difference, *D*

The sound level difference between two internal spaces, or between internal and external spaces. The ‘*D*’ value is used to denote the differences at each third octave or octave band, with a single figure ‘weighted’ value to describe an overall performance. Note that the '*D*' value will always describe an in-situ or on-site acoustic performance. All values are described using the decibel.

D_w	Single figure weighted sound level difference, simply the measured source noise level minus receiver noise level, not adjusted to reference conditions
$D_{nT,w}$	Weighted normalised sound level difference – a single, weighted sound insulation value, normalised to a reference reverberation time using the measured reverberation time in the receive room
$D_{nT,w} + C_{tr}$	As above, with a spectral adaptation term applied to account for the effects of low frequency noise, and based on urban traffic noise
$D_{nf,w}$	Overall flanking normalised level difference - A parameter that defines the flanking transmission of sound from room to room where a dividing partition or floor construction abuts a flanking building element common to both rooms, such as the building façade or ceiling

Sound reduction index, *R*

This describes the sound transmitted through a material or building element, such as a wall, door, or window. It is measured in a laboratory with suppressed flanking transmission. The '*R*' value is used to denote the differences at each third octave or octave band, with a single figure 'weighted' value to describe an overall performance. All values are described using the decibel.

R_w	Weighted single figure sound reduction index
$R_w + C_{tr}$	As above, with a spectral adaptation term applied to account for the effects of low frequency noise, and based on urban traffic noise
R'_w	The 'apparent sound reduction index,' a field measurement to obtain the sound reduction index of a material or element, with all effects of site installation accepted.

Appendix IV. Report Conditions

This document has been prepared for the sole use, benefit and information of the Client. The liability of Stroma Built Environment Ltd. in respect of the information contained herein will not extend to any third party unless prior agreement is obtained in writing from Stroma Built Environment Ltd.

This report is limited to addressing the specific acoustic issues contained herein. Advice has been provided for acoustic reasons only and it is recommended that appropriate expert advice be sought on all the ramifications, e.g. safety, fire, structural, CDM etc., associated with any proposals contained herein.

The in-situ performance of acoustic measures is influenced to a large extent by the quality of workmanship and compliance with the specifications on-site during construction, as such, Stroma Built Environment Ltd. accepts no liability for issues with acoustic performance arising from such factors.

Acoustic survey and testing work carried out for the project is representative of the prevailing conditions at the time of the work. Conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

In particular, it should be noted that where calculations are carried out that are based on assumptions regarding certain aspects where information has not been supplied, these are provided for indicative purposes only and should be treated as such.