ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 2814

20 December 2018

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ST MICHAEL'S AVENUE, MONK BRETTON

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT ADT 2814/ENIA

Revision	Date	Issued By	Checked by	Revision Notes
-	20 December 2018	Mark Barnes	Chris Middleton	first issue

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1.0 SUMMARY

Planning permission is being sought for a new residential development, as shown on the planning application drawings.

Acoustic Design Technology Limited have undertaken an environmental noise survey to determine the existing ambient noise levels in the vicinity.

Noise generated by industrial operations and incident on the proposed development site has been assessed using BS4142:2014.

The predicted cumulative rating level incident on the proposed development site is above the typical background level during the proposed hours of operation. According to BS 4142:2014, this is "... *an indication of the specific sound source having a significant adverse impact, depending on the context ".*

When the context is taken into account, including the low absolute noise levels, the established residential character of the surrounding area and the opportunity to provide sound insulation measures, the residual impact should be lower, and the site should therefore be suitable for residential development.

2.0 BASIS OF ASSESSMENT

2.1 Site Location

The site is currently an empty field located at the end of St Michael's Avenue, Monk Bretton. It is on a moderate incline, rising in height from north to south.

The site is bounded by existing residential properties to the south and east. To the north and west of the site is a collection of industrial premises primarily along Shawfield Road. Haywood and Padgett Ltd are approximately 30 metres away to the north-west, and appear to be a bakery with associated warehousing.

To the west of the site the nearest unit some 110 metres away appeared to be inactive at the time of the survey, with no company signage. Beyond that is the XPO Logistics warehouse, approximately 135 metres from the site.

Ardagh Glass industrial complex is approximately 240 metres away to the south-east, beyond the existing housing estate.

The nearest notable roads include Industry Road and West Green Way to the north and Carlton Road to the west. The larger urban area and associated transport infrastructure of Barnsley is located to the south-west of the site.

2.2 Proposed Development

Planning permission is being sought for a new residential development on land situated at the end of St Michael's Avenue.

2.3 Assessment Criteria

Following initial consultation with planners and a conversation with Environmental Health Officer James Gardham at Barnsley Metropolitan Borough Council, it has been agreed that a noise assessment following the guidelines in BS 4142:2014 is to be undertaken, based on a survey of typical day time industrial operations.

2.4 Strategy for Noise Impact Assessment

Based on the information in Sections 2.1 to 2.3 above, the strategy for the noise impact assessment has been broken down into the following stages:

i. undertake an environmental noise survey to obtain baseline noise data, as described in Section 3.0 below

ii. assess the impact of noise emissions from the nearby industrial operations as described in Section 4.0 below

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Purpose

The purpose of the survey was to measure the noise levels on the site over a sample of typical day time industrial operations.

3.2 Scope of Survey

An attended environmental noise survey was undertaken between 14:00 hours and 17:00 hours on Monday 3 December 2018.

3.3 Instrumentation

The instrumentation used, and the field calibration values before and after the survey are detailed in Appendix A of this report.

3.4 Procedure

Four measurement positions were selected as described below and indicated on the attached site plan 2814/SP1:

i. on site, within a 5 metre radius of the north western corner

ii. on site, within a 5 metre radius of the south eastern corner

iii. on site, within a 5 metre radius of the north eastern corner

iv. on site, within a 5 metre radius of the south western corner

The measurement positions were selected in order to measure the variation in noise levels around the site.

At all positions the microphone was mounted on a tripod approximately 1.2 metres above the ground and least 3.5 metres from any other acoustically reflective surfaces.

Measurements were taken hourly at each position using the 01dB Blue Solo sound level meter set to store the octave band and A-weighted 100ms short-term L_{eq} levels over a 10 minute sample of each hour for subsequent post processing.

3.5 Results

The logged data has been post processed to determine $L_{Aeq,T}$ $L_{A90,T}$ and L_{Amax} levels for each 10 minute period, and these are set out in the attached table 2814/T1.

The logged $L_{eq,T}$ octave-band levels for the loudest 10 minute period at each measurement position are set out in the attached table 2814/T2.

Please refer to Appendix B for explanation of the noise units and the A-weighting term used in this report.

3.6 Weather Conditions

For the duration of the survey, the weather conditions were dry and still, and had no effect on the measured levels.

3.7 Description of Existing Acoustic Environment

The noise levels on the site were controlled primarily by noise from Haywood and Padgett Ltd. including noise from deliveries, such as pallets being moved from lorries into the warehouse, and vice versa. Additionally, there was a constant drone from plant, originating from Haywood and Padgett Ltd. and possibly other industrial premises further to the north.

Distant traffic noise also affected the background noise levels, particularly at positions 2 to 4, and there was transient noise from bird song and aeroplanes.

During the first measurement at position 1, the noise levels were largely controlled by a street cleaner vehicle manoeuvring for the entire measurement period around the yard at Haywood and Padgett Ltd, which is not considered typical of the working day.

4.0 NOISE IMPACT ASSESSMENT

4.1 Introduction

As already mentioned in Section 2.3 above, the Council requirement is that noise from existing industrial operations is assessed using the BS 4142:2014 method, based on an assessment of day time noise levels.

The standard provides a methodology for assessing the likely impact of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The assessment involves comparing the *rating* level of the sound source with the typical *background* levels for the period of interest. The standard concludes that if the rating level does not exceed the background levels, the noise impact should be low, depending on the context.

Please refer to Appendix C for an explanation of the technical terms defined in the Standard.

4.2 Specific Sound Level

After processing the data collected during the survey, the specific sound level has been identified as 51 dB $L_{Aeq,1\ hour}$. This assumes that the 10 minute samples are typical of the 1 hour period. The associated octave band frequency spectra are in the attached table 2814/T2.

The first measurement at position 1 has been discounted as the elevated levels being generated by a street cleaner vehicle moving about the Haywood and Padgett site, an activity which is assumed to be untypical.

4.3 Background Sound Level

Reference to the survey results shows that the typical background level during the daytime period was 46 dB $L_{A90,10mins}$. It is possible that this was affected to some extent by the various industrial operations, although that is true for the whole of the surrounding area, and it is therefore reasonable to use this as the background level.

4.4 Rating Level

To convert the specific sound level into a rating level, corrections have to be applied for impulsivity, intermittency, tonality and other sound characteristics where such features are present.

4.4.1 Tonality

Using commonly accepted definitions of tonality, the predicted specific sound level is not tonal. However, the residual plant noise was subjectively tonal and therefore a tonal correction is required. As it is subjectively just perceptible the correction is +2 dB.

4.4.2 Impulsivity

The observed noise emissions from the operations in Haywood and Padgett Ltd. yard were often impulsive in character, so a correction of +6 dB is appropriate for clearly perceptible impulsive noise.

4.4.3 Intermittency

The observed activities of loading and unloading vehicles, and light landscaping around the Haywood and Padgett building were intermittent. On that basis, there is intermittency to the sound causing it to be distinctive against the residual sound, so a correction of +3 dB is required

Applying these corrections for tonality, impulsivity, and intermittency to the specific sound level results in a predicted rating level of 62 dB $L_{Ar,1\ hour}$.

4.5 Initial Assessment of Impact

The attached calculation 2814/C1 provides the initial estimate of impact, following the methodology of BS 4142:2014.

The predicted rating level is numerically equivalent to the typical background level, so the standard concludes that this is "... *an indication of the specific sound source having a significant adverse impact, depending on the context*".

4.6 Context

4.6.1 The Absolute Level of Sound

The measured noise levels are relatively low, with a specific noise level of $L_{Aeq,\ 1\ hour}$ 51 dB and a background level of L_{A90} 46 dB. The levels are also very consistent across the site, with little variation between the noise levels on the western boundary closest to the industrial premises and the eastern boundary closest to the existing dwellings.

In other words, while the determination of a BS 4142:2014 rating level indicates a significant excess over the background level, the reality is that low intensity industrial noise is typical of the existing residential area. On that basis the absolute level of sound suggests a lower impact than that indicated by the initial assessment.

4.6.2 The Character and Level of the Specific and Residual Sound

As noted in Section 4.7.1 above, the noise levels in the surrounding area are controlled by low level industrial noise, and while some of the industrial operations are distinctive above the background level, they are entirely typical of this area. On that basis it is not necessary to adjust the impact for the character and level of the sound.

4.6.3 The Sensitivity of the Receptor

At the time of writing the layout of the residential development has not been finalised, although it is likely to comprise low rise houses / apartments similar to the neighbouring properties, with associated parking and gardens.

As the dwellings are new, there is scope for providing sound insulation measures to reduce the initial assessment of impact. Suitable criteria are provided in BS 8233:2014 for living rooms, bedrooms and outdoor amenity areas.

In terms of the noise levels inside dwellings, it would be a simple matter to control the specific noise level of $L_{Aeq,\ 1\ hour}$ 51 dB to the BS 8233:2014 recommended limit of $L_{Aeq,\ 16\ hour}$ 35 dB during the day or indeed the night time limit of $L_{Aeq,\ 8\ hour}$ 30 dB, as the resulting 21 dB noise reduction can easily be provided by modern building constructions, including standard thermal double glazing (typically R_w 29) and trickle vents (typically $D_{ne,w}$ 30).

This would be for the scenario of Approved Document F 'whole house ventilation' with windows closed. With the windows open for purge ventilation or summer cooling, a 15 dB noise reduction should still be achievable, with indoor ambient noise levels only slightly above the BS 8233 day time limit.

In gardens, the specific noise level of $L_{Aeq,\ 1\ hour}$ 51 dB is already within the BS 8233 recommended range of $L_{Aeq,\ 16\ hour}$ 50 – 55 dB. This can be enhanced by providing solid timber fencing (nominally 2400mm) to the gardens on the boundary with the industrial premises.

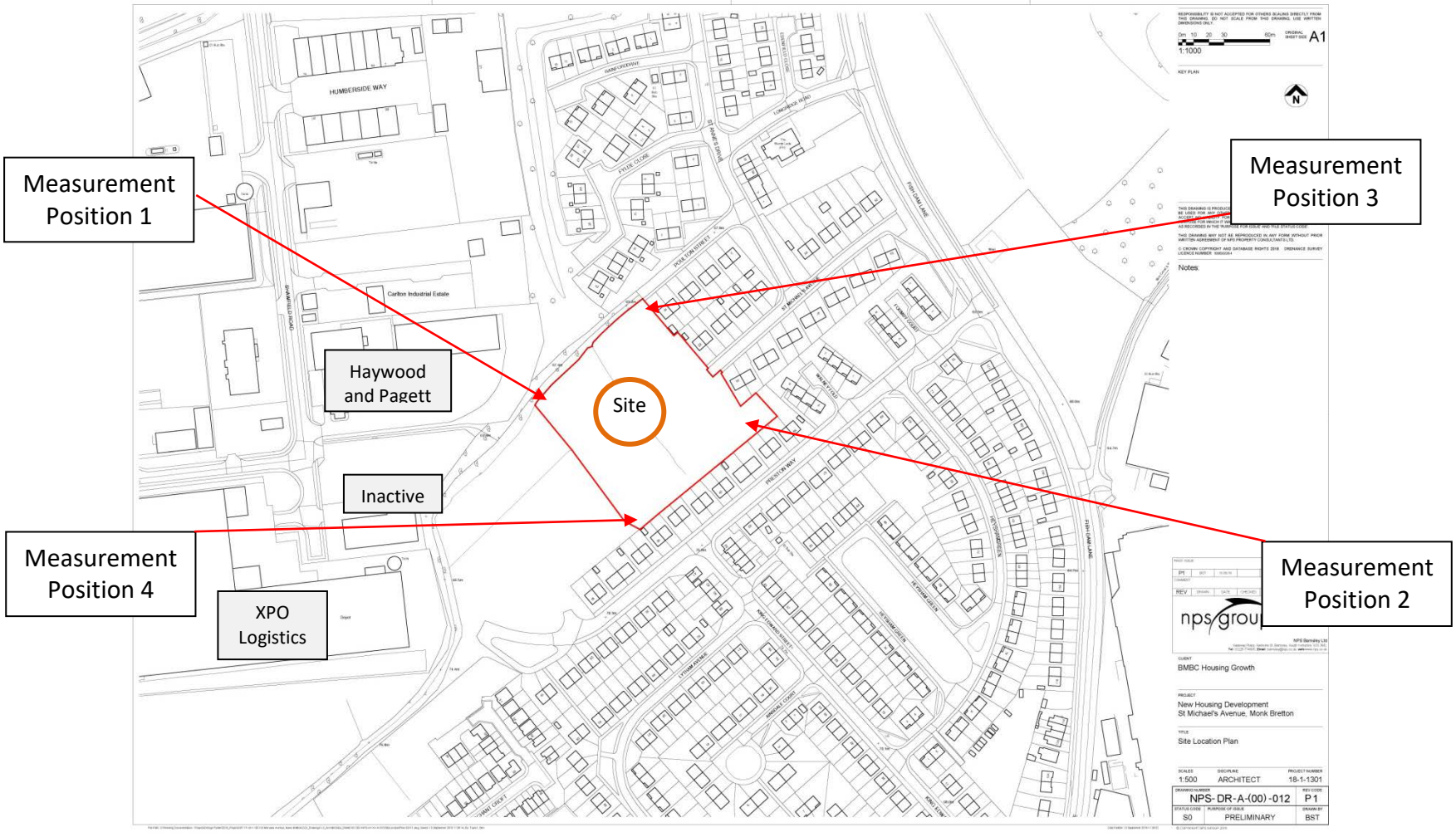
Overall, while the initial assessment of the impact is adverse, when the context is taken into account, including the low specific noise level, the proximity to an established residential area, and the potential for sound insulation measures to the new dwellings, it would be reasonable to conclude that the residual impact should be less significant.

4.7 Conclusions

This assessment has demonstrated that when assessed following the methodology of BS 4142:2014, the initial estimate of the impact of industrial noise would be significant adverse, depending on context.

Consideration of the context has shown that this may affect the initial estimate of the impact, which may be reduced due to a combination of factors including the low specific noise level, existing residential properties nearby, and the option for new dwellings to include sound insulation measures. On that basis it should be possible to develop the site for residential use.

FOR ACOUSTIC DESIGN TECHNOLOGY



Notes

Description

Site Plan Showing Noise Monitoring Locations

Project

St Michael's Avenue, Monk Bretton

Survey Date	**Drawing No.**
3 December 2018	2814/SP1

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SURVEY RESULTS

Position	Period	$L_{Aeq,\ 10mins}$ dB	L_{Amax} dB	L_{A90} dB
1	14:00 – 15:00	59	68	54
	15:00 – 16:00	48	62	46
	16:00 – 17:00	51	76	46
2	14:00 – 15:00	50	68	46
	15:00 – 16:00	48	65	46
	16:00 – 17:00	51	68	46
3	14:00 – 15:00	49	63	47
	15:00 – 16:00	49	63	46
	16:00 – 17:00	49	62	47
4	14:00 – 15:00	50	65	47
	15:00 – 16:00	51	63	48
	16:00 – 17:00	48	57	47

TABLE 2814/T1

Highest $L_{eq,T}$ spectra by position excluding untypical noise

Location	Measured $L_{eq,T}$ (dB) at octave band centre frequency (Hz)								$L_{Aeq,T}$ dB
	63	125	250	500	1k	2k	4k	8k	
Measurement Position 1	59	54	48	48	47	44	35	27	51
Measurement Position 2	58	53	43	47	47	41	43	33	51
Measurement Position 3	59	55	47	47	44	40	31	25	49
Measurement Position 4	60	53	47	46	46	44	37	28	51

TABLE 2814/T2

APPENDIX A – INSTRUMENTATION

Manufacturer	Type and / or Model	Serial Number	Last Laboratory Calibration	Calibrator Output (dB)	Free Field Correction (dB)	Initial reading (dB)	Final reading (dB)
01dB	(Blue) Solo Class 1 Sound Level Meter	60320	April 2017				
01dB	PRE 21 S Pre-Amplifier	16866	April 2017		-0.10	114.1	113.9
01dB	MCE 212 ½ inch Microphone	90549	April 2017				
Norsonic	Nor1251 Calibrator (Cal 5)	34220	January 2018	114.19			

APPENDIX B

Acoustic Terminology

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

A-weighting — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the A-weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the A-weighted noise level by applying certain corrections to an un-weighted spectrum.

When the noise being measured has variable amplitude, such as traffic noise, it is necessary to qualify the basic dB unit. This may be done using a statistical index L_n dB, where n is any value between 0 and 100, and is the percentage of the sample time for which the stated level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

L_{10} — L_{10}, being the level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} — L_{90} is the level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

$L_{eq,T}$ — $L_{eq,T}$ is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period. In other words, it is a measure of the "average" noise level

L_{max} — L_{max} is the maximum time-weighted sound pressure level recorded over the stated time period

APPENDIX C

Definitions from BS 4142 : 2014

reference time interval, T_r

specified interval over which the specific sound level is determined (1 h during the day, and 15 min during the night)

specific sound level, $L_{Aeq,Tr}$

equivalent continuous A-weighted sound pressure level produced by the specific source at the assessment position produced over a given reference time interval, T_r

rating level, $L_{At,Tr}$

specific sound level plus any adjustment for the characteristic features of the sound

background noise level, $L_{A90,T}$

see Appendix A

BS 4142 : 2014 ASSESSMENT

Results		Commentary
Measured sound level	$L_{Aeq,T}$ = 51 dB	
Residual sound level	-	not applicable
Background sound level	$L_{A90,10mins}$ = 46 dB	from survey results
Assessment made during the daytime, so the reference time interval is 1 hour		
Specific sound level	$L_{Aeq,T}$ = 51 dB	
Acoustic feature correction	+11 dB	
Rating level	(51 + 11) dB = 62 dB	
Background sound level	$L_{A90,10mins}$ = 46 dB	from survey results
Excess of rating over background sound level	(62 - 46) dB = 16 dB	
Assessment indicates likelihood of significant adverse impact depending on the context		

CALCULATION 2814/C1