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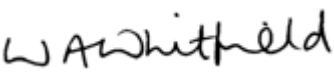
Environmental Noise Assessment

Prepared: 8th February 2022

Report No	21917-1
Client	JB Fabrication Group
Site	JB Fabrication, Bryn Lane Wrexham Industrial Estate Wrexham, LL13 9UT

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1. Quality Management

Report Number	21917 - 1
Issue	Issue 1
Prepared	8 th February 2022
Prepared By	 Shaun Sloan BSc, MIOA
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3. Executive Summary

3.1.1. An environmental noise assessment has been carried out for a proposed new extension at JB Fabrication, Bryn Lane, Wrexham Industrial Estate, Wrexham, LL13 9UT ("Proposed Development").

3.2. Measurement, Assessment and Evaluation

3.2.1. The survey was carried out to BS7445-1:2003,¹ BS7445-2:1991² and BS4142:2014³ which are covered under our UKAS Accreditation.

3.2.2. The interpretation of the data and the specification of suitable mitigation or treatment are outside the scope of our UKAS accreditation but is covered in our 17025 Quality Management System and reporting procedure.

3.3. Scope

3.3.1. This report covers all aspects of the noise survey, including:

- the identification of acoustic design criteria;
- the identification of specific sound sources;
- an objective sound pressure level survey of the existing site;
- calculation of the specific sound levels;
- calculation of appropriate acoustic feature corrections and determination of the rating level ;
- assessment of the specific sound sources based on guidance contained in BS4142:2014; and
- the design of any mitigation to meet the required internal noise criteria.

3.4. Results Summary

3.4.1. A numerical BS4142 assessment shows that the rating level is predicted to be below the existing background sound levels and therefore complies with the condition set out by the local authority.

3.4.2. It is very **important** that the Client employs a best practice approach to ensure noise is contained within the new building and keep the shutter doors closed to optimise the building attenuation. This would be considered best practice in controlling noise emissions from the site.

¹ BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Description of quantities and procedures"

² BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

³ BS4142:2014 "Methods for rating and assessing industrial and commercial sound"

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5. Background

5.1. Noise Policy Statement for England

- 5.1.1. The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is to *“promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”*.
- 5.1.2. This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- Avoid significant adverse impacts on health and quality of life;
 - Mitigate and minimise adverse impacts on health and quality of life;
 - Where possible, contribute to the improvement of health and quality of life.
- 5.1.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

5.2. National Planning Policy Framework

- 5.2.1. The National Planning Policy Framework (NPPF) was published on the 27th of March 2012 and was most recently updated on the 20th July 2021; it sets out the Government’s planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:

“preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability”.

- 5.2.2. The NPPF requires that new developments be appropriate to their locations such that the effects of pollution on health have been taken into account. Planning policies and decisions should aim to:
1. avoid noise giving rise to significant adverse impacts on health and the quality of life;
 2. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development; and,
 3. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.
- 5.2.3. Existing businesses near to proposed development 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.

5.3. National Planning Practice Guidance

- 5.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) which was published on the 29th November 2016 and is regularly updated to reflect the changes made to the NPPF and make it more accessible.⁴

⁴ <http://planningguidance.communities.gov.uk/>

- 5.3.2. There are a number of factors that determine whether a noise could be a concern to a receptor. These include: the absolute level of the noise and when it occurs, whether it is existing or new to the area, temporal characteristics, spectral content and the acoustic absorption in the area.

Perception	Examples of outcomes	Effect level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and not intrusive	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.	No Observed Adverse Effect (NOAEL)	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	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 character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	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.	Significant Observed Adverse Effect	Avoid
Noticeable and very intrusive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 1 – Noise exposure hierarchy

- 5.3.3. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include: engineering the noise sources to be quiet, minimising the impact of noise through layout, using conditions/obligations to restrict activities, mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

6. Introduction

6.1.1. An environmental noise assessment has been carried out for a proposed new extension at JB Fabrication, Bryn Lane, Wrexham Industrial Estate, Wrexham, LL13 9UT ("Proposed Development").

6.2. Proposed Development

6.2.1. An image showing the location of the Proposed Development and approximate distance between the nearby existing receptor is given in Figure 1.



Figure 1 - Plan showing the location of the Proposed Development (Green dash outline) and nearest existing receptor (Purple dash outline)

6.2.2. The new extension will have 8 bays intended for welding. It is understood from the client the new proposed extension will be constructed using Kingspan 1000. Figure 2 shows the elevations and sections of the new proposed extension.



Figure 2 – Proposed new extension elevations and section detail

6.3. Noise Climate

6.3.1. At the time of the survey visits, the survey technician noted the noise climate was dominated by transient road traffic noise from Bryn Lane. Industrial/commercial activity from JB Fabrication was just audible at 1 Bryan Cottages in periods when no vehicles were passing.

7. Assessment Criteria

7.1. BS4142:2014

- 7.1.1. BS4142 provides methods for rating and assessing **specific sound sources** of an industrial and/or commercial nature, which includes: industrial and manufacturing processes, fixed services plant, sound generated by the loading/unloading of goods and sound from mobile plant/vehicles associated with industrial/commercial premises (e.g. fork-lift trucks). The **assessment location** is outside a residential receptor.
- 7.1.2. The standard is specifically precluded from being used to assess the likely impact inside a building or from the assessment of various sound sources for which other (more relevant) guidance exists, including: music/entertainment noise, noise from people and construction noise.
- 7.1.3. The foundation of the assessment is to establish the following quantities, either by measurement or prediction:
- **Ambient sound:** The overall sound at the assessment location
 - **Residual sound:** The ambient sound without the specific sound source operating
 - **Specific sound:** The ambient sound with the specific sound source operating, corrected for residual sound
 - **Background sound:** Residual sound present for 90% of the time
- 7.1.4. How these quantities relate to the sound that would be measured during a survey has been illustrated in Figure 3.

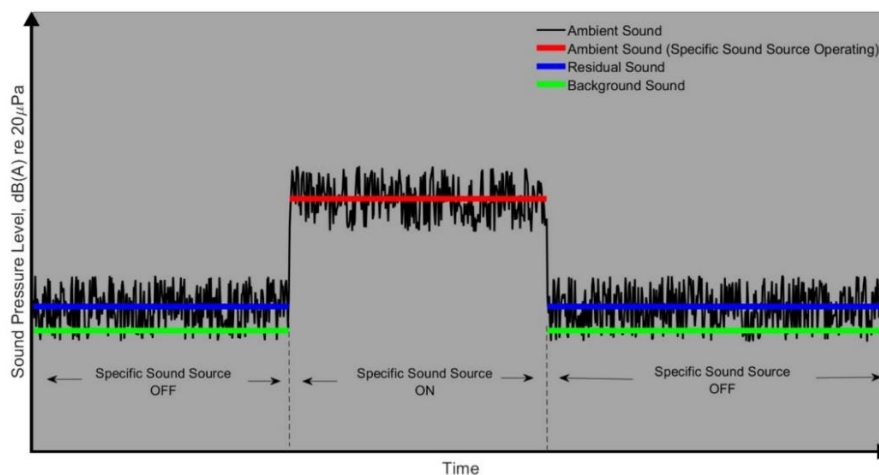


Figure 3 –
Diagrammatic
illustration of the
definitions of ambient,
residual, specific and
background sound

- 7.1.5. Once the specific sound level has been determined, this must be corrected for the presence of acoustic features that are audible at the assessment location to determine the **rating level**:

$$\text{Rating Level} = \text{Specific Sound Level} + \text{Character Corrections}$$

- 7.1.6. Normally it is possible to carry out a subjective assessment of characteristics, based on the following correction guidelines:
- Tonality: +2dB for a 'just perceptible' tone, +4dB for 'clearly perceptible', and rising to +6dB for 'highly perceptible' tones.
 - Impulsivity (rapidity of change and overall change in level): +3 dB for 'just perceptible' impulsivity, +6dB for 'clearly perceptible', rising to +9 dB for 'highly perceptible' impulsivity.
 - Intermittency: if the on/off-time of the specific sound is readily distinctive at the noise- sensitive receivers, +3dB.

- 7.1.7. It should be noted that, where one feature is clearly perceived as dominant, it may be appropriate to apply a single correction. Where multiple features are likely to affect perception and response, each should be added arithmetically.
- 7.1.8. An estimate of the magnitude of the impact is evaluated by subtracting the measured background sound level at the assessment location from the rating level

$$\text{Assessment Level} = \text{Rating Level} - \text{Background Sound Level}$$

- 7.1.9. Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 emphasises that this is highly context-specific. As an initial estimate, BS4142 states that:
- A difference (between the background and rating level) of around +10 dB or more is likely to be indicative of significant adverse impact, depending on context
 - A difference (between the background and rating level) of around +5 dB or more is likely to be indicative of adverse impact, depending on context
 - Where the rating level does not exceed the background level, this is an indication that the specific sound will have a low impact, depending on context
- 7.1.10. Where the initial estimate of the impact needs to be modified due to the context, other factor should be considered, including: absolute sound levels, the character and level of the residual sound and the sensitivity of the receiver, which includes the effect of building façade sound insulation.

7.2. Local Planning Authority Criteria

- 7.2.1. The local planning authority has provided specific noise-related planning requirements for the Proposed Development. The noise-related requirements have been reproduced in Figure 4.

ZP05 - NOISE GENERATION - BS4142 REQUIRED

The rating level of any noise generated by reason of this development shall not exceed the pre-existing background level at any time. The noise levels shall be determined at nearby noise sensitive premises, and measurements and assessment shall be made in accordance with BS4142:2014 Methods for rating and assessing industrial and commercial sound.

Figure 4 – Noise related planning requirements provided by the local planning authority

8. Survey

8.1. Measurement Locations

- 8.1.1. Unattended measurements were made to determine the typical background sound levels at the nearest receptor. Attended measurements were also carried out inside the existing workshop to measure the specific level from an operative welding. The attended and unattended monitoring positions are shown in Figure 5.

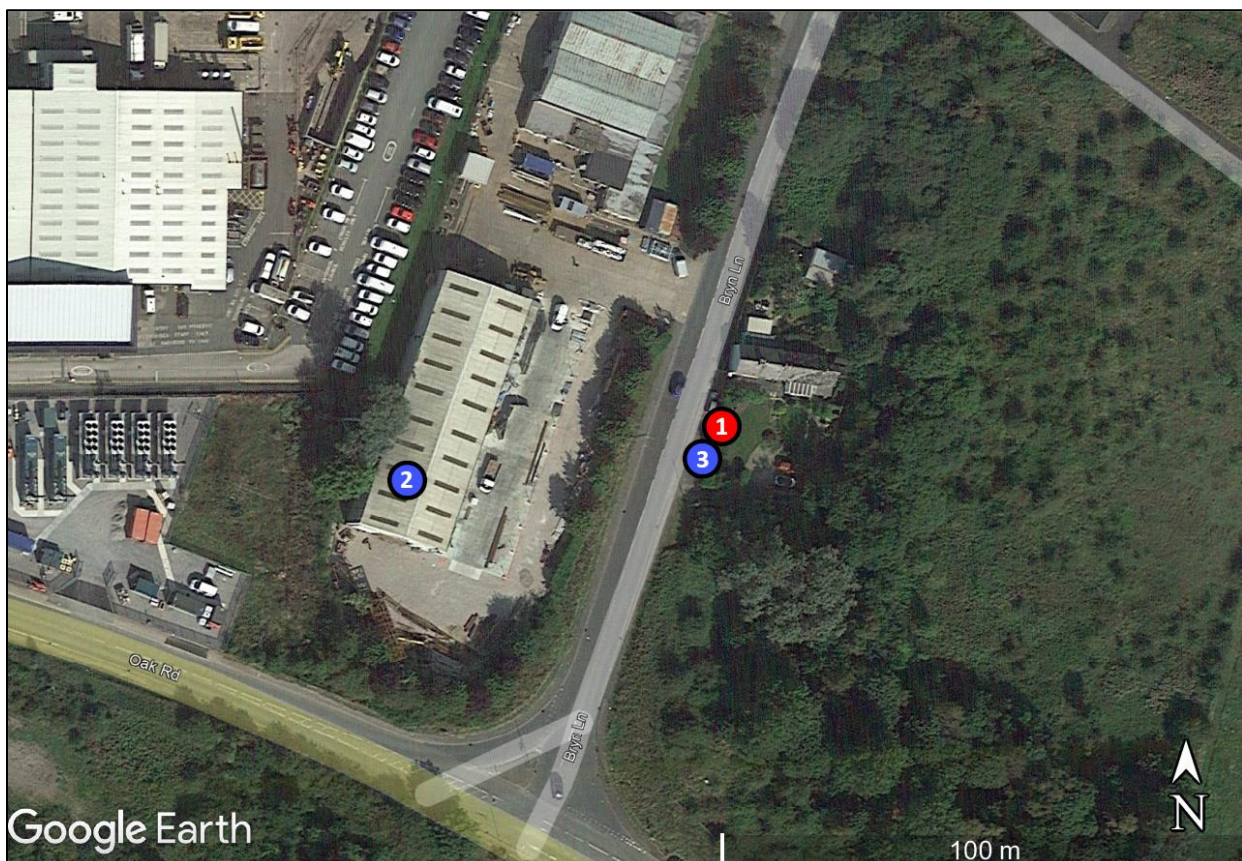


Figure 5 – Unattended and attended noise monitoring locations

- 8.1.2. The measurement instrumentation used during the survey is detailed in the appendix. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003⁵ before and after the surveys. The calibration details are also detailed in the appendix.

8.2. Meteorology

- 8.2.1. During the survey the weather information was noted. This is summarised in Table 2.

	2 nd February 2022	4 th February 2022
Roads(Wet/Dry)	Dry	Dry
Wind Speed (ms ⁻¹)/Direction	3/W	5/W

Table 2 - Meteorological data noted during the survey

⁵ BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures"

8.3. Measurement and Timescale

- 8.3.1. Unattended monitoring was carried out between 2nd February 2022 and 4th February 2022. Attended monitoring was carried out on the 2nd February 2022. The measurements that have been made are summarised in Table 3.

Monitoring position	Date	Type	Quantity
1	2 nd February 2022 – 4 th February 2022	Unattended	L _{A90,15-min}
2	2 nd February 2022	Attended	L _{Aeq,25ms} Audio Recording
3	2 nd February 2022	Attended	FFT's

Table 3 – Attended measurements

- 8.3.2. Sound pressure measurements were subsequently averaged into hourly, daytime and night-time periods. The acoustic measurements and their interpretation have been in accordance with BS 7445: Parts 1, and 2⁶. All sound pressure levels are in dB (re 20μPa).

⁶ BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

8.4. Results Summary

Background Sound Levels

- 8.4.1. Figure 6 and Figure 7 shows the results of the data analysis in terms of the frequency of occurrence of each data value during the daytime and the night-time respectively.

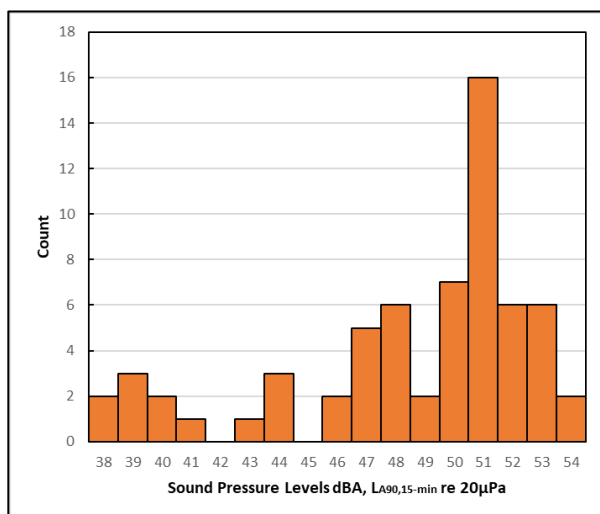


Figure 6 – Distribution of background sound levels during the daytime (07:00-23:00)

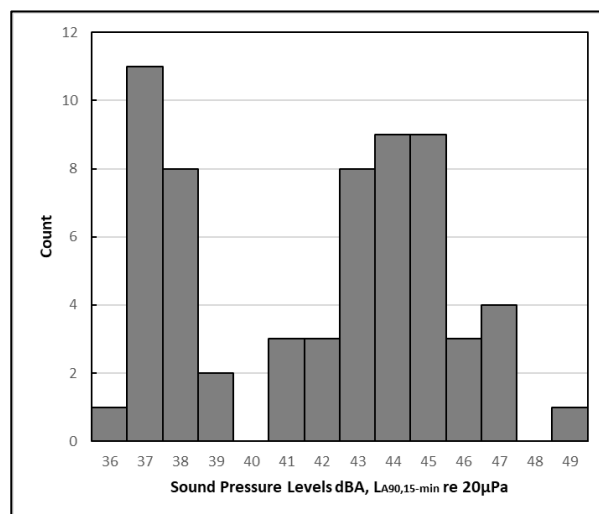


Figure 7 – Distribution of background sound levels during the night-time (23:00-07:00)

- 8.4.2. Figure 6 shows the background sound levels ranged between 38dB $L_{A90,15-min}$ and 54dB $L_{A90,15-min}$ during the daytime period. Figure 7 shows that the background sound levels ranged between 36dB $L_{A90,15-min}$ and 49dB $L_{A90,15-min}$ during the night-time period.
- 8.4.3. The typical background sound level has been taken to be 51dB $L_{A90,15-min}$ during the daytime and 37dB $L_{A90,15-min}$ for the night-time.

8.5. Specific Sound Levels

- 8.5.1. Short term L_{Aeq} measurements (25ms) were made during the attended surveys. The specific sound level for the individual event have been summarised in Table 4.

Monitoring Position	Duration	Description	Specific Sound Level, L_s dB(A)
2	1-min	Operative welding	84.9

Table 4 – Summary of the specific sound level measurements

9. 3D Noise Model

- 9.1.1. A noise model has been constructed in SoundPLAN™ to calculate the specific sound level 1m from the façade of the nearby existing receptor. The model uses the calculation method from ISO9613-2:1996⁷ to account for the distance between the source and receiver and any screening or reflections provided by the surrounding buildings.
- 9.1.2. The terrain has been assumed to be flat for the purposes of the modelling because the nearest existing receptor to the FB Fabrications are at the same level. The locations of the buildings surrounding the proposed new extension have been taken from the plans provided by the client.
- 9.1.3. The specific sound level measurements taken at monitoring position 2 of the operative welding were used in the noise model to calculate the sound power level. An industrial object was used to create the new extension with point sources inside to emulate 8 operatives welding.
- 9.1.4. The new extension building envelope was taken into account which includes the absorption characteristics and sound reduction performance of the Kingspan 1000 product system. The precise product reference from the Kingspan 1000 range is unknown. On this basis, we have assumed the minimum absorption and sound reduction performance from the Kingspan 1000 product range as a worst-case scenario in the model. The building envelope properties have been taken from manufacturers data (See appendix) and provided below in Table 5 and Table 6.

AWP/60 + no lining	Octave Band Sound Reduction Index R								Rw
	63	125	250	500	1000	2000	4000	8000	
SRI (dB)	15	16	19	23	25	22	39	-	25

Table 5 – Octave band sound reduction performance for Architectural Wall Panel (AWP) with no wall lining

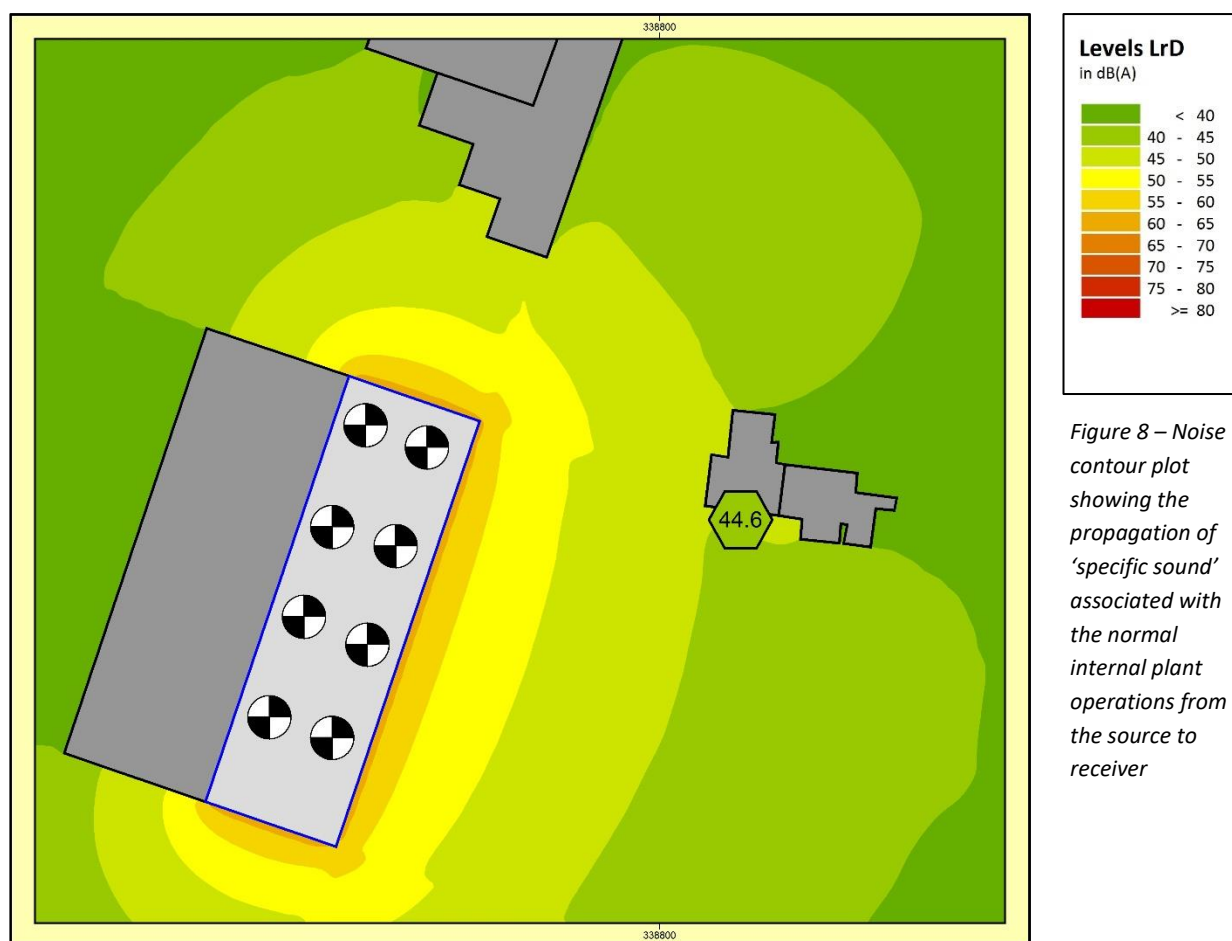
KS1000 RW + no lining	Octave Band Sound Reduction Index R								Class
	63	125	250	500	1k	2k	4k	8k	
Absorption	0.07	0.25	0.2	0.1	0.15	0.1	0.08	0.15	E

Table 6 – Absorption sound performance for Kingspan 1000 Rw with no lining

- 9.1.5. Welding activity has been assumed to operate 100% of the reference time period to determine the worst case specific level. Furthermore, it should be noted the shutter doors in the model have been assumed shut which would be considered best practice in normal circumstances associated with minimising noise impact from the development.

⁷ ISO9613-2:1996 “Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation”

9.1.6. Noise contour plots illustrating the propagation of the specific sound from source to receiver are given in Figure 8.



10. BS4142 Assessment

10.1. Rating Level

- 10.1.1. The existing commercial sound sources were operating at the time of the attended survey. The sources have been assessed based on the character of the sound at the boundary with the nearest existing receptor. The adjustments to the specific sound levels for acoustic features have been discussed in the following sections.

Tonality

- 10.1.2. The reference method from BS4142 has been used to determine the audibility of tones at the boundary of the nearest existing receptor (Monitoring position 3). The autospectra that were used an FFT size of 1.46Hz, implemented a Hanning window and had been A-weighted. The measurements used to create the autospectra were made at the location of the nearest residential receiver.
- 10.1.3. The noise pauses were identified in the spectra using an automated computer routine. The tones have been identified and evaluated, taking into account the appropriate half or quarter power bandwidths. Where two or more tones appear in the same critical band, their energies have been combined. The masking noise was evaluated using a regression line spanning ± 0.75 of the critical frequency band, only noise lines within 0 ± 0.5 of the critical frequency band were included in the masking noise. Corrections for the effective analysis bandwidth have been taken into account. The threshold of hearing has been taken into account and tones identified below 50Hz have automatically been excluded.
- 10.1.4. The tone audibility acoustic feature corrections during the survey have been summarised in Table 7.

Source description	Tone Audibility, L_{ta}	Adjustment, K_t (dB)
Run 1		
Event 1 - Source	1.7	0
Adopted Correction		0

Table 7 – Tonality acoustic feature correction applied to specific sound levels

Impulsivity

- 10.1.5. The sudden 'onset' of a sound is defined as an impulse and occurs when the rate of increase in sound exceeds 10dB/s. The start and end of the onset was determined using a combination of computer automation and expert listening. The worst case onset rate and level difference were determined and used to predict the subjective prominence of the impulse and calculate the acoustic feature adjustment, K_i , to be added to the L_{Aeq} to adjust for the acoustic feature.
- 10.1.6. In this case, the new extension will be used for welding which is not expected to be impulsive based on the character of sound. Therefore, no correction has been applied for impulsivity

Intermittency

- 10.1.7. Welding could be considered intermittent based on the observations from the attended survey. However, it is not expected at the nearby existing receiver to be noticeable and therefore no correction for intermittency has been applied.

10.2. Assessment

- 10.2.1. JB Fabrication operates between 08:00 – 16:15 Monday – Friday and between 08:00 and 00:00 occasionally on Saturdays. Based on this, the BS4142 assessment only applies during the operations. The BS4142 assessment is detailed in Table 8

	Level, dB
	Daytime (07:00-23:00)
Background sound level, dB $L_{A90,15min}$	51
Specific sound level, dB(A)	45
Acoustic feature corrections	
Tonality	+0
Impulsivity	+0
Intermittency	+0
Rating level	
Specific sound level + corrections	45
Assessment Level	
Rating level – Background sound level	-6
<i>"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"</i>	

Table 8 - The assessment procedure from BS4142

10.3. Context

- 10.3.1. In this situation, the location of the new extension is in an area predominately used for industrial/commercial use. It is understood from FB Fabrication the operations in the past were sometimes carried out in the open, in this case in the external yard. It would be expected with the new proposed extension to the building these activities would now be moved inside the new facility which would be of significant benefit to the nearby residential receptor.

11. Conclusions

- 11.1.1. An environmental noise assessment has been carried out for a proposed new extension at JB Fabrication, Bryn Lane, Wrexham Industrial Estate, Wrexham, LL13 9UT ("Proposed Development").
- 11.1.2. A numerical BS4142 assessment shows that the rating level is predicted to be below the existing background sound levels and therefore complies with the condition set out by the local authority.
- 11.1.3. It is **important** FB Fabrications adopt best practical means to keeping the shutter door open to a minimum to avoid compromising the sound reduction performance of the new extension and increasing the specific level at the nearby existing receptor.
- 11.1.4. We strongly recommend that this report be passed to the local planning authority for approval prior to any works being carried out.

12. Appendix

APPENDIX A: Summary Information

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991 BS4142:2014	BS4142:2014
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	JB Fabrication Group	
D	Full site address	JB Fabrication, Bryn Lane Wrexham Industrial Estate Wrexham, LL13 9UT	
E	Date of surveys	Survey Date: 2 nd February 2022 - 4 th February 2022	
F	Description & identification of Proposed Development	New proposed extension to an existing fabrication facility	
G	Brief Description of details of Procedure & equipment	See Section 5 of this report.	

APPENDIX B: Technical Appendix

12.1.1. Measurements were made using the following equipment:

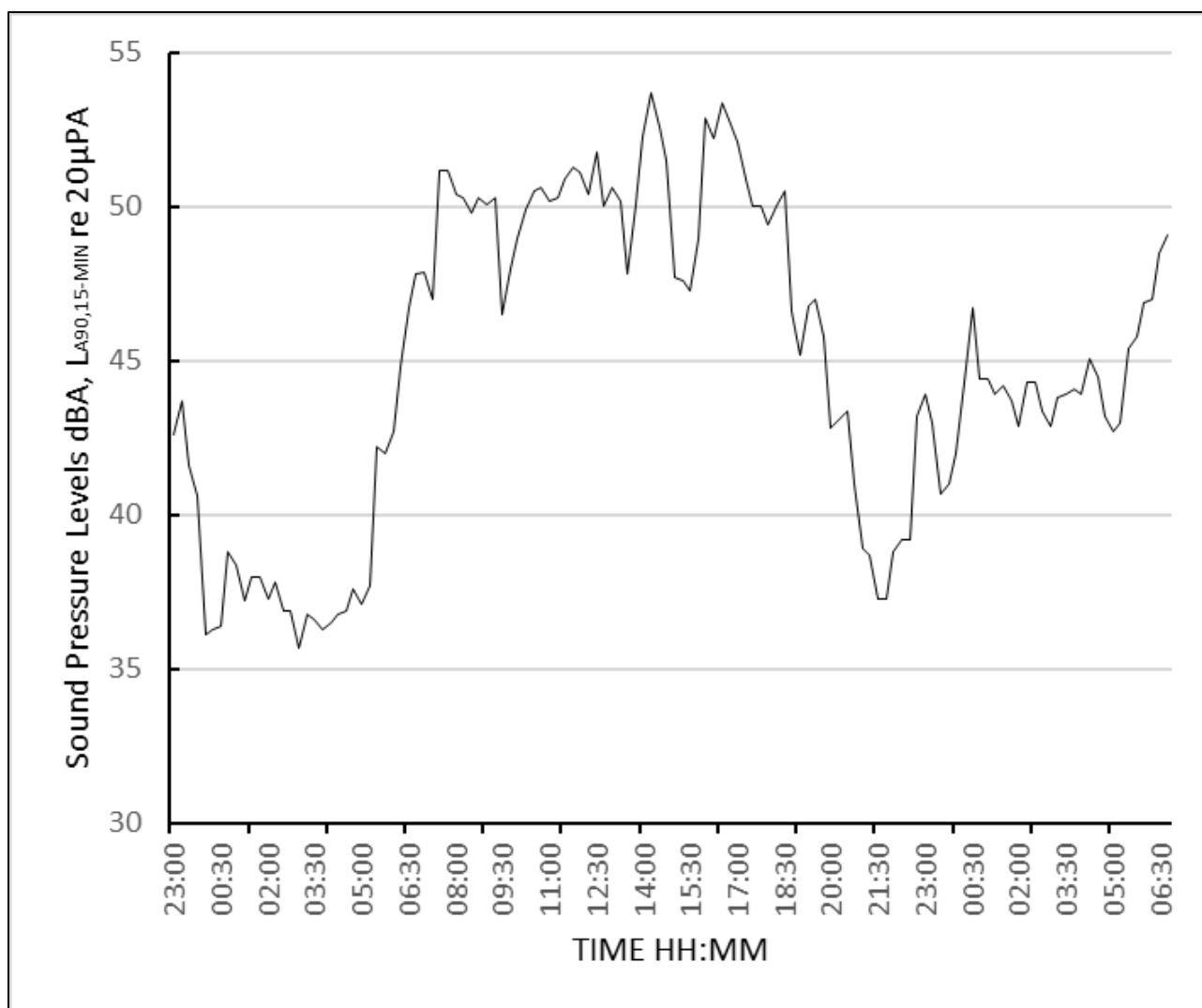
Monitoring Position	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
1	SoftdB Piccolo 2 (PO221070105)	BSWA CA114 (590010)
2	Norsonic 140 (1405559)	Norsonic 1251 (33823)
3	Norsonic 140 (1405559)	Norsonic 1251 (33823)

12.1.2. The equipment has traceable calibration. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

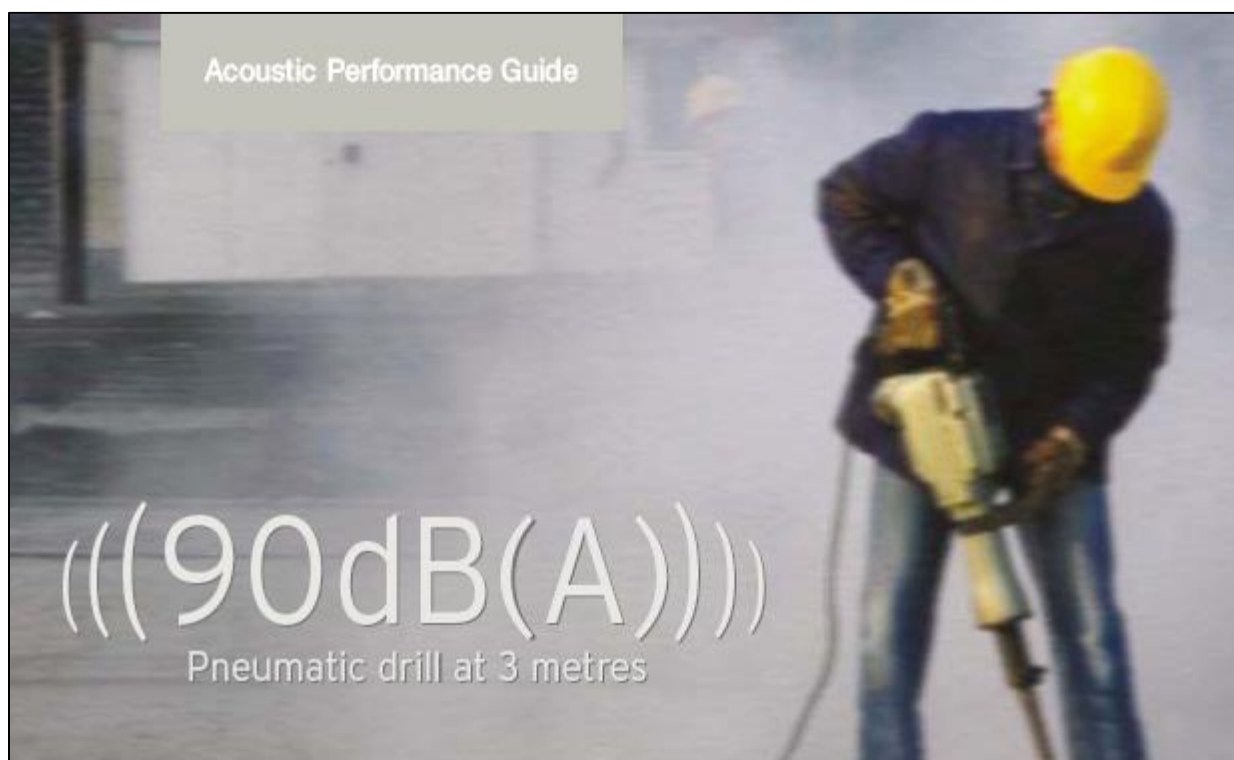
Sound Level Meter	Before	After
SoftdB Piccolo 2 (PO221070105)	94.0 dB	94.0 dB
Norsonic 140 (1405559)	114.0 dB	114.0 dB

12.1.3. There was no adverse deviation.

APPENDIX C: Background Sound Levels



APPENDIX D: Manufactures data



Acoustic Test Results Appendix A - Wall/Facade Panel Construction

Octave Band Sound Reduction Index (R) and Weighted Sound Reduction Index (R_w)

Wall	Panel and Lining	Octave Band Sound Reduction Index R								R _w	C _w	Surface Weight Kg/m ²
		63	125	250	500	1k	2k	4k	8k			
1W	AWP/60 + no lining	15	16	19	23	26	22	39	-	25	-3	18
2W	AWP/60 + F	12	19	32	42	50	52	60	-	43	-10	30
3W	AWP/60 + W15	14	17	31	40	48	46	56	-	41	-10	28
4W	AWP/60 + W15 + F	17	24	37	45	52	54	64	-	47	-9	40
5W	AWP/60 + P + W12	16	22	37	45	51	50	63	-	46	-10	41
6W	AWP/60 + P + W12	18	23	35	44	49	50	61	-	45	-8	41
7W	AWP/60 + I + P + W	18	24	37	48	53	55	63	-	48	-10	4
8W	KS1000 RW/40 + I + L	13	14	29	38	40	45	55	-	38	-9	20
9W	KS1000 RW/40 + I + L	12	16	30	40	44	51	64	-	40	-9	20
10W	AWP/70 + no lining	20	15	17	23	18	25	40	46	24	-4	12.5

Key

AWP = Architectural Wall Panel with various profiles (Optimo, MR, EB, FL, MM, CX, WV, Longspan)

F = 10mm dense particle board (11.7kg/m²)W15 = 15mm plasterboard (10kg/m²)W12 = 12.5mm wallboard (7.9kg/m²)P = 10mm dense plasterboard plank (15.2kg/m²)

I = Insulation (see construction description for details)

L = 0.7mm profiled steel liner sheet

The figures after the forward slash refers to the panel thickness in mm (ie AWP/60 = panel thickness of 60mm)

Acoustic Performance Guide

Acoustic Test Results Appendix C - Flanking Tests

Octave Band Sound Reduction Index (R) and Weighted Sound Reduction Index (R_w)

Wall	Panel and Lining	Octave Band Sound Reduction Index R								R _w	C _w
		63	125	250	500	1k	2k	4k	8k		
1F	KS1000 RW/80 + no lining	14	30	35	40	35	45	54	57	40	-3
2F	KS1000 RW/80 + FSC	16	28	34	41	35	45	54	58	40	-4
3F	KS1000 RW/80 + FSC	17	29	37	44	36	46	55	62	42	-5
4F	KS1000 RW/80 + FSC	16	30	37	43	36	46	55	62	42	-5
5F	KS1000 RW/80 + FSC + Pb	28	34	41	46	52	62	62	68	51	-5
6F	KS1000 RW/80 + FSC + I + Pb1	29	39	50	58	64	66	63	68	60 ^{*(67)}	-7
7F	AWP/70 + I	17	33	41	44	40	50	56	63	45	-4
8F	AWP/70 + I + PbM	19	34	43	46	41	50	57	64	47	-5
9F	AWP/70 + I + PbZ	32	36	49	57	63	66	63	69	59 ^{*(63)}	-9
10F	KS1000 RW/80 + I + PL	21	21	24	34	52	58	57	56	37	-5

Key

+ See construction description for details

** Limited by performance of partition wall - Figures in brackets are calculated performances without the influence of partition wall.

FSC Fire Stop and Covers - Mineral fibre packing (80kg/m³) and 90 degree coverflashings with mastic beads at edges.

AWP Architectural Wall Panel with various profiles (Optimo, MR, EB, FL, MM, CX, WW, Longspan)

The figures after the forward slash refers to the panel thickness in mm (ie RW/80 = panel thickness of 80mm)

Test walls were flanking a partition wall comprising 8 x 12.5mm standard wallboard each side of 50mm isolated timber studs with a 150mm cavity between inner layers of plasterboard containing 100mm of 45kg/m³ mineral fibre insulation - estimated R_w 61 dB.

Acoustic Test Results Appendix D - Constructions for Absorption Test

Octave Band Sound Reduction Index (R) and Weighted Sound Reduction Index (R_w)

Flanking Construction	Panel and Lining	Octave Band Sound Reduction Index R								NRC	α _w	Class*
		63	125	250	500	1k	2k	4k	8k			
1A	KS1000 RW + no lining	0.07	0.25	0.20	0.10	0.15	0.10	0.08	0.15	0.10	0.15	E
2A	KS1000 RW panel + perf metal lining 30% free area + 50mm insulation 40/60 kg/m ³	0.15	0.45	0.70	0.85	0.90	0.90	0.75	0.60	0.85	0.90	A

Key

* = Classification according to EN ISO 11654 (See Figure 3 for detail).

APPENDIX E: Tone audibility

