



Acoustic Survey and Assessment for proposed extraction unit (including emissions details) at Forrest Joinery and Construction Contracts Ramsgreave Works Pleckgate Road Blackburn BB1 8QW

Prepared for:

Forrest Joinery and Construction Contracts Ltd
Ramsgreave Business Park
Pleckgate Lane,
Blackburn
BB1 8QW

October 2017



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1. Introduction

- 1.1. Martin Environmental Solutions has been commissioned to undertake a noise survey and an acoustic assessment in support of a planning application for a new extraction system at Forrest Joinery and Construction Contracts, Ramsgreave Works, Pleckgate Road, Blackburn, BB1 8QW.

Site Location and Context

- 1.2. The development site is located to the rear of the Forrest Joinery works on Pleckgate Road. To the south west of the site are more industrial units forming the estate. To the north open countryside and to the northeast a care home. An aerial photograph identifies the site in Figure 1.
- 1.3. The home is approx. 20m from the site and has no outside amenity area. The Forrest Joinery site operates from 08:00 – 17:00 during the week.
- 1.4. It is the proximity to this home that has raised concerns over the potential impact of the new extraction system and hence this report.



2. Policy and Guidance

- 2.1 The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It is recognised that on occasions it will be difficult to reconcile some land uses, such as housing, hospitals or schools, with other activities that generate high levels of noise. However, the planning system is tasked to ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development).
- 2.2 The Government's publication of the National Planning Policy Framework (NPPF), which seeks to prevent new and existing development from contributing to or being put at unacceptable risk from noise pollution, has replaced previous Planning Policy Statements and Planning Policy Guidance Notes.
- 2.3 The Government have also issued the Noise Policy Statement for England (NPSE). The NPSE clarifies the Government's underlying principles and aims in relation to noise and sets a vision to promote good health and a good quality of life through the effective management of noise while having regard to the Government's sustainable development strategy. The NPSE aims to mitigate and minimise adverse impacts on health and quality of life through the effective management and control of noise.
- 2.4 The NPSE introduces the following terms although no sound levels are given to represent these many authorities including those within Lancashire have identified the sound level criteria in line with the World Health Organisation, BS8233:2014 and BS4142: 2014 levels. The terms introduced by the NPSE are:
- NOEL – No Observed Effect Level (<30dB(A) inside <50dB(A) outside, 10dB below background)
 - LOAEL – Lowest Observed Adverse Effect Level (30-35dB(A) inside 50-55dB(A) outside, background to +5dB)
 - SOAEL – Significant Observed Adverse Effect Level (>35dB(A) inside, >55dB(A) outside, >+10dB above background)
- 2.5 The sound levels within the brackets of the previous paragraph are those determined by Lancashire authorities as appropriate levels to indicate the relevant effect levels represented by the NPSE. These levels are detailed within the Lancashire Planning



Guidance document on noise which is in the process of being finalised and is currently used by a number of Lancashire authorities.

- 2.6. Other commonly used examples of standards utilised by Local Planning authorities for the consideration of noise impacts include comparison of the likely noise levels to be experienced at a development, with levels that have been recommended by the World Health Organisation (WHO) as Guidelines for the prevention of Community Noise Annoyance and within BS8233: 2014.
- 2.7. The WHO recommended noise levels for outdoor amenity areas (gardens) that should not be exceeded are 55dB(A) $L_{Aeq,16hr}$ in order to avoid 'Serious Community Annoyance' or 50dB(A) $L_{Aeq,16hr}$ to avoid 'Moderate Community Annoyance' during the day. For indoor levels WHO set 35dB(A) $L_{Aeq,16hr}$ during the day to prevent Moderate Annoyance and 30 dB(A) $L_{Aeq,8hr}$ at night to prevent sleep disturbance.
- 2.8. BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' also specifies desirable noise levels to be achieved inside dwellings.
- 2.9. BS 8233:2014 'Sound insulation and noise reduction for buildings – Code of Practice' also specifies desirable noise levels to be achieved inside dwellings. BS 8233 presents two levels, the first between the hours of 07:00 – 23:00 and the second between 23:00 -07:00.
- 2.10. The daytime period suggests internal noise levels of 35dB $L_{Aeq,16hr}$, for resting in living rooms and bedrooms while for night time a level of 30dB $L_{Aeq,8hr}$ is recommended, with exterior levels mirroring those identified by the World Health Organisation.
- 2.11. British Standard 4142:2014 '*Method for rating industrial and commercial sound*' compares the sound predicted by the source in question against the background, L_{A90} sound levels.
- 2.12. The "residual" L_{Aeq} measurement is then subtracted from the "ambient" L_{Aeq} measurement (with the sound source) to calculate the sound level created by the "problem" sound alone -termed the "specific" sound level.



- 2.13. If the "problem" sound is tonal, such as whine or hum, or if it is impulsive such as bangs or clatters or if it is irregular enough to attract attention a correction is added to the "specific level" to produce the "rating level". The "background" L_{A90} measurement is then compared against the "rating level".
- 2.14. If the "rating level" exceeds the "background" by around 10 dB(A) or more this "indicates a significant adverse impact". A difference of around 5 dB(A) 'indicates an adverse impact. The lower the commercial noise level is, the lower the likely impact.



3. The Assessment

- 3.1. Attended monitoring of the existing sound levels on site was undertaken on the 28th September 2017, from 07:00-13:00. The monitoring location was the corner of the grass verge to the care-home opposite the proposed site of the extraction system, see Figure 1 for monitoring location.
- 3.2. The meter was positioned approx. 4 m from the buildings to avoid reflections and at a height of 1.5m. The weather during the monitoring period was dry, with no wind. Towards the end of the monitoring period cloud cover was building and shortly after the monitoring had finished it started to rain.
- 3.3. All measurements were taken using a Cirrus, Optimus Green CR-171B, Type 1 sound level meter. The meter was calibrated before and after use and no significant deviation was identified. The calibration certificates are shown in Appendix C.
- 3.4. Full results of the monitoring are provided in Appendix A, but the average sound level over the morning ranged from 50-70dB L_{Aeq} , with a background sound level ranging from 40-68dB L_{A90} .
- 3.5. The higher levels correspond to the existing extraction unit used on site which was recorded at around 69dB(A).
- 3.6. The lower figure of 40dB(A) will be utilised within this report as the background L_{A90} sound level, with the corresponding L_{Aeq} figure of 54.8dB.
- 3.7. The proposed new extraction system, a Dust Control Systems Ltd reverse jet air filter extraction unit, will be fitted with an acoustic enclosure and has a sound level of 63.3dB(A) at 1m. This results in a sound level of 37.3dB(A) outside the care home, below the current prevailing lowest background sound level.
- 3.8. A standard double-glazed window unit when partially open provides 15dB attenuation¹ and therefore the resulting sound level within the proposed properties will be 22.3dB(A). Substantially below the recommended internal sound levels continued within BS8233: 2014 and those recommended by the World Health Organisation.

¹ BS8233: 2014; Guidance on sound insulation and noise reduction for buildings



- 3.9. In addition, a BS4142:2014 assessment has been undertaken and is contained within Appendix B. This demonstrates that based on the lowest background sound level measured on site the new extraction system will not result in a significant adverse impact on the nearby sensitive land use.
- 3.10. Subjectively the new unit will also be substantially quieter than the existing unit, by over 30dB(A), thus improving the overall amenity of the area.



4 Conclusion

- 4.1 The assessment undertaken has been based on the lowest existing background sound level measured on site, with the current extraction system turned off. Average background sound levels monitored over the measurement period showed the average background sound level L_{A90} was approximately 8dB higher, with the existing extraction unit 28dB(A) higher than the figure used in the assessment.
- 4.2 The resulting sound levels from the new extraction unit on the nearby home will be below the prevailing lowest background sound level in the area, and below the levels recommended within BS8233:2014 and by the World Health Organisation and identified by the Lancashire Authorities Noise and Planning Guidance document.
- 4.3 A BS4142: 2014 assessment has also been undertaken the results of which suggest that the development will not have a significant adverse impact on the nearby care-home.
- 4.4 In line with the requirements of the National Planning Policy Framework the proposed development will not result in a significant adverse impact on the nearby housing development.



5 Emission Assessment

- 5.1. The new extraction system has been specifically chosen to remove more dust from the manufacturing areas of the building to ensure a safe working environment for staff. Equally important is to ensure that this extracted dust does not escape into the environment.
- 5.2. The extraction system is therefore fitted Superbag 2000 XT 17WB fabric filters. Like most filters these allow air to escape the extraction system while ensuring the dust is captured, collected and later disposed of. The system is also fitted with an air return so that warm extracted air can be returned to the work area to assist with heating during colder months.
- 5.3. The system has a capacity to remove 22550m³/hr, with a filter area of 170m². The filters have an efficiency 99.5% when tested against air containing dust particle size 0.2-2µg. Data sheet in Appendix D.
- 5.4. On site real life testing of the system has also been carried out and the results indicate that less than 0.05mg/m³ of dust is released from the system.
- 5.5. Under Environmental Permitting legislation a typical standard to be applied to any filtration system is 5-10mg/m³, as detailed in a number of the DEFRA produced process guidance notes e.g. PG 6/02, timber manufacture states 5mg/m³ and PG3/1, cement matching states 10mg/m³.
- 5.6. The proposed filtration unit far exceeds these specifications and as such is highly unlikely to result in any significant adverse impact on the neighbouring properties. The new system is also far more efficient than the current system installed on site and will reduce current emissions from the site.
- 5.7. It is also noted that the air quality is generally good in the area of the proposed site with DEFRA background pollutant maps suggesting ambient levels of PM₁₀ and PM_{2.5} well below the national objective levels of 40µg/m³ at 12.64 and 8.97 respectively, again indicating that the proposed system will not significantly adversely affect the local air quality in line with the National Planning Policy Framework.

Figure 1 – Aerial Photograph





Appendix A – Monitoring Results

Time	L _{Aeq} (dB)	L _{AMax} (dB)	L _{A90} (dB)
28/09/2017 07:00	50.2	73.5	40.5
28/09/2017 08:00	58.7	83.6	47.9
28/09/2017 09:00	54.8	75.4	39.3
28/09/2017 10:00	67.9	83.3	48.7
28/09/2017 11:00	69.5	75.8	68.0
28/09/2017 12:00	66.4	104.8	42.0



Appendix B - BS414:2014 Assessment

Measured Ambient sound level	$L_{Aeq} = 54.8\text{dB}$	Calculated from measured data and manufacturers data ($54.8+37.3=54.8$)
Residual Sound level	$L_{Aeq} = 54.8\text{dB}$	Measured sound level.
Background Sound Level	$L_{A90} = 40\text{dB}$	Lowest measured background on site
Reference period 60 minutes		Normal ref period,
Specific sound Level	$L_{Aeq} = 37.3\text{dB}$	Calculated from manufacturers data
Acoustic feature	+3dB	Slight tonal is likely from the new plant although no details have been provided.
Rating level	$37.3+3=40.3\text{dB}$	
Background sound level	$L_{A90} = 40\text{dB}$	
Excess of Rating level over background level	($40.3-40$) dB = 0.3dB indicates no significant adverse impact	
Uncertainty		Calculation based on the lowest background sound level identified during the measurements, the highest background was an additional 28dB(A), with an average of an additional 8dB(A). No tonal / octave information provided by the manufacturer.



Appendix C – Calibration Certificate

Certificate of Calibration



Equipment Details

Instrument Manufacturer Cirrus Research plc
Instrument Type CR:171B
Description Sound Level Meter
Serial Number G066429

Calibration Procedure

The instrument detailed above has been calibrated to the publish test and calibration data as detailed in the instrument hand book, using the techniques recommended in the latest revisions of the International Standards IEC 61672-1:2013, IEC 61672-1:2002, IEC 60651:1979, IEC 60804:2001, IEC 61260:1995, IEC 60942:2003, IEC 60942:1997, IEC 61252:1993, ANSI S1.4-1983, ANSI S1.11-1986 and ANSI S1.43-1997 where applicable.
Sound Level Meters: All Calibration procedures were carried out by substituting the microphone capsule with a suitable electrical signal, apart from the final acoustic calibration.

Calibration Traceability

The equipment detailed above was calibrated against the calibration laboratory standards held by Cirrus Research plc. These are traceable to International Standards {A.0.6}. The standards are:

Microphone Type	B&K 4192	Serial Number	1920791	Calibration Ref.	S6450
Pistonphone Type	B&K 4220	Serial Number	613843	Calibration Ref.	S6388

Calibrated by

Calibration Date

07 April 2017

Calibration Certificate Number

248049

This Calibration Certificate is valid for 12 months from the date above.

Cirrus Research plc, Acoustic House, Bridlington Road, Hunmanby, North Yorkshire, YO14 0PH
Telephone: +44 (0) 1723 891655 Fax: +44 (0) 1723 891742
Email: sales@cirrusresearch.co.uk

Certificate of Calibration

Certificate Number: **111525**
Date of Issue: **07 April 2017**



Acoustic Calibrator

Manufacturer: **Cirrus Research plc** Serial Number: **65564**
Model Number: **CR:515**

Calibration Procedure

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC 60942:2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

Date of Calibration: **06 April 2017**

Initial Calibration Results

Measurement	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
1	93.90	1000.3	0.33
2	93.89	1000.3	0.34
3	93.91	1000.3	0.34
Average	93.90	1000.3	0.33
Uncertainty	± 0.13	± 0.1	± 0.10

The reported uncertainties of measurement are expanded by a coverage factor of k=2, providing a 95% confidence level.

Adjusted Calibration Results

Measurement	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
1	94.00	1000.3	0.34
2	93.99	1000.3	0.34
3	94.01	1000.3	0.34
Average	94.00	1000.3	0.34
Uncertainty	± 0.13	± 0.1	± 0.10

The reported uncertainties of measurement are expanded by a coverage factor of k=2, providing a 95% confidence level.

Cirrus Research plc, Acoustic House, Bridlington Road
Hunmanby, North Yorkshire, YO14 0PH, United Kingdom
Telephone: 0845 230 2434 Int: +44 1723 891655
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UK Registration No. 987160



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FM 531001

EMS 552104



Certificate of Calibration



Certificate Number: **111526**

Date of Issue: **07 April 2017**

Microphone Capsule

Manufacturer: **Cirrus Research plc**

Serial Number: **204018A**

Model Number: **MK224**

Calibration Procedure

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to the National Physical Laboratory, Middlesex, UK.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

Date of Calibration: **04 April 2017**

Open Circuit: **47.7 mV/Pa**

Sensitivity at 1 kHz: **-26.4 dB rel 1 V/Pa**

Environmental Conditions

Pressure: **101.50 kPa**

Temperature: **21.0 °C**

Humidity: **42.0 %**

Calibration Laboratory

Laboratory: Cirrus Research plc
Acoustic House, Bridlington Road, Hunmanby
North Yorkshire, YO14 0PH, United Kingdom

Test Engineer: Debra Swalwell

Cirrus Research plc, Acoustic House, Bridlington Road
Hunmanby, North Yorkshire, YO14 0PH, United Kingdom
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Web: www.cirrusresearch.co.uk
UK Registration No. 987160



FM 531001 EMS 552104

Appendix D – Filter Specifications

Filter materials for NFZ3000 filters

Nederman

SUPERBAG 2000 XT 17WB

Quality	Circular knitted with two integrated layers filter	
Material	100 % polyester	
Colour / Characteristics	White with black circular stripes	
Dust flow side	Smooth side	
Weight	500	g/m ²
Air permeability	210	m ³ /m ² /h at 200 Pa
Max. operating temperature	143	°C
Intermittent peak temperature	160	°C
Melting point	250-260	°C
BIA classification	L	99.5 % filtration of 200 mg/m ³ Test dust (90 % 0,2-2,0 µ)
Electrostatic behaviour	Surface resistance 1,5 x 10 ⁸ Ohm Charging towards PA – 2,1 kV	DIN 54 345 TEIL 1 TEFO Method 40-77
Moisture influence	Very small	
Air to cloth ratio recommended	75 – 160	m ³ /m ² /h depending on dust characteristics
Applications	Filtration of: Shavings, saw dust, sanding dust, lacquering dust from woodworking industry as well as other fibrous materials such as mineral wool, paper strips and –dust.	

Patent no.: EU 000 5923, SP51 8252, IN 156, 561.



One of the most esteemed institutes in Finland has measured the dust content in the return air ducts from 4 filters. The filters were measured 23-25 November 1999. Each filter was measured in 3 periods of 3-4 hours.

Filter 1, 31800 m3/h polishing NFK2000 7+1 HJLR. Average dust content measured: 0,04 mg/m3 (Actual: 0,05; 0,03 and 0,05 mg/m3)

Filter 2, 16700 m3/h sanding NFK2000 9+2 HJLR. Average dust content measured: 0,05 mg/m3 (Actual: 0,04; 0,09 and 0,01 mg/m3)

Filter 3, 45000 m3/h veneer handling NFK2000 6+1 HJLR. Average dust content measured: 0,02 mg/m3 (Actual: 0,02; 0,03 and 0,02 mg/m3)

Filter 4, 55100 m3/h misc. sawing, moulding etc. NFK2000 8+1 HJLR. Average dust content measured: 0,02 mg/m3 (Actual: 0,04; 0,01 and 0,02 mg/m3)

For more info see attached report in Finnish or contact HW

Attachments: [NFK Schaumann wood Finnish.doc](#)

(http://intranet/Forums/index.cfm?CFApp=1&Message_ID=24)

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Date: 31-Jan-00 11:38

Author: Klaus Bihlet (kb@disacenter.com)

Subject: NF2000 at Bodilsen Component, MDF, Part.Board and Pine dust

Bodilsen Component in Skive DK produce components for furnitures. Approx 40% MDF, 40% particle board and 20% pine.

The attached report (in danish) from official approved DK authorities state that the dust content in the clean gas is 0,042 - 0,045 mg/m3.