

Environmental Noise Report

Proposed Residential Development
Huyton Quarry
Hale View Road
Liverpool
L36 6BP

Date of Report: Friday 1st February 2019

Reference: 12016 Rev 0

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1 General Information

1.1 Site Address

Proposed Residential Development
Huyton Quarry
Hale View Road
Liverpool
L36 6BP

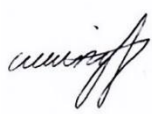
1.2 Client Instructing Survey

Mr Graham Powell
KDP Architects Ltd
13 Seymour Terrace
Seymour Street
Liverpool
L3 5PE

1.3 Date of Noise Survey

Wednesday 23rd to Thursday 24th January 2019
Friday 1st February 2019

1.4 Report Author

	Name	Position	Signature	Date
Prepared by	Will Wright BSc AMIOA	Acoustic Consultant		01/02/2019
For and on behalf of: Soundtesting.co.uk Ltd				

1.5 Report Checked

	Name	Position	Signature	Date
Report Checked	M S Hamer MSc MIOA	Acoustic Consultant		01/02/2019
For and on behalf of: Soundtesting.co.uk Ltd				



2 Introduction

KDP Architects Ltd has instructed Soundtesting.co.uk Limited to undertake an environmental noise survey in order to assess the impact of sound from the general noise within the local environment, including that of the operations at the adjacent Parcellforce Worldwide premise, which may have an impact on future residents of the proposed development.

The proposed development is the erection of 4no. residential apartments. The site is located at Huyton Quarry, Hale View Road, Liverpool.

This report is prepared solely for KDP Architects Ltd. Soundtesting.co.uk Limited accepts no responsibility for its use by any third party.

This document has been prepared using the various documents listed within the appendices of this report, together with drawings, technical information and additional verbal representations made by third parties. We have not audited nor independently verified the content or accuracy of any of the documents and information provided to us in the preparation of this report.

If additional information comes to light subsequent to the production of this report, we reserve the right to revise our opinions and the conclusions reached within this report.

2.1 An Environmental Noise Assessment

Soundtesting.co.uk Ltd has undertaken an environmental noise assessment at the above site with noise levels measured, consisting of 9 hours in the day (14:00 – 23:00) and an eight-hour night (23:00 – 07:00) as well as 1 hour in the morning (07:00 – 08:00). The measurements were carried out during week days. A sample measurement of what appears to be a boiler chimney exhaust was also taken.

This report will state the measured noise levels and will refer to guidance relevant to the nature of this survey whilst considering Local Planning Authority guidance and conditions.

3 Assumptions & Limitations

- a. All suggested specifications require a good level of workmanship and for materials to be installed as the manufacture intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building elements.
- b. It is assumed that the sound pressure levels measured on site during the environmental noise survey are typical of the site.
- c. It is assumed that the technical data provided by glazing and ventilation manufacturers is up to date and correct.
- d. It is assumed that drawings and information supplied by KDP Architects Ltd are up to date and correct.



4 Planning Policies, Guidance and Criteria

The planning policies and criteria listed below are taken from associated relevant guidance documents, all of which should be considered for the internal and external noise and vibration levels.

4.1 Planning Policy

4.1.1 Noise Policy Statement for England (NPSE)

In March 2010 the Government issued a Noise Policy Statement for England (NPSE). The aim of this document is to “provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.”

The NPSE sets out the long term vision for Government noise policy.

Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

The NPSE includes three primary aims: all interpreted by having regard to a set of shared UK principles that underpin the Government’s sustainable development strategy. The Government’s sustainable development strategy is provided in NPSE paragraph 1.8.

Noise Policy 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; and*
- *where possible, contribute to the improvement of health and quality of life*

The NPSE aims include the terms “significant adverse” and “adverse”

The World Health Organisation is currently applying the following established concepts from toxicology to noise impacts:

- *NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*
- *LOAEL – Lowest Observed Adverse Effect Level This is the level above which adverse effects on health and quality of life can be detected.*

The NPSE expands these terms leading to the concept of a Significant Observed Adverse Effect Level.

- *SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.*

The NPSE goes on to state that it is not possible to have a single objective noise-based measure that defines SOAEL that will be applicable to all sources of noise in all situations. Consequently, the



SOAEL is likely to be different for different noise sources, for different receptors and at different times.

4.1.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) July 2018 set out the Government's planning policies for England and how they are expected to be applied. It provides a framework within which the Local Authorities are to prepare local plans and use their planning powers to minimise the adverse impact of noise. It should contain the following in relation to noise impacts.

170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

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

180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

'mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life'

Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*



4.2 Criteria

4.2.1 BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

The British Standard BS 8233:2014, Guidance on Sound Insulation and noise reduction for buildings, gives guidance on internal noise levels within dwellings, flats and rooms in residential use when unoccupied. The following criteria are for Living and Dining Rooms for daytime use and Bedrooms for night time.

Table 1: BS 8233:2014 Recommended Internal Noise Levels			
Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

In addition, BS 8233 suggests, “regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values”.

4.2.2 WHO Guidelines for Community Noise

In 1999, the WHO (World Health Organisation) published Guidelines for Community Noise, stating the following internal noise levels are applicable within dwellings.

Table 2: A Summary of the Guidance Noise Levels				
Specific Environment	Critical Health Effect (s)	L_{Aeq} (dB)	Time base (hours)*	L_{AFmax} (dB)
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

* Typically taken to be daytime/evening - 07:00 – 23:00 and night time 23:00 – 07:00.



4.3 Local Authority Criteria

Ian Gaskell, the Senior Officer for Environmental Health at Knowsley Council has agreed to the following methodology on 23rd January 2019.

"Hi Ian

Thanks for your time earlier. As discussed in respect to the above project. We agreed that as Parcel Force is a 24-hour operation and that night time noise is critical.

Our methodology is as follows:

Measure an 8-hour period between 23:00 and 07:00 Equipment will be collected just after 08:00 and therefore covers early morning when businesses are commencing work

We will also measure a daytime period of around 3 hours between 14:00 and 17:00 in order to establish levels of commercial noise and road noise during a typical day

The meter will also run through the evening from 17:00 up to 23:00 as well

The assessment will be based around the guidance for internal levels in accordance with Table 5 of BS8233 and LAFmax levels stated in WHO Environmental Guidelines.

Adding to this we will measure in LAeq 5-minute sample periods and in 1:3 octaves in order to identify any noise characteristics.

We don't consider vibration an issue and therefore won't consider this as part of our assessment."

4.4 Criteria Summary

All recommendations will be made in order to meet the criteria of BS8233:2014 with reference to WHO Community Noise Guidelines as agreed with Knowsley Council.



5 Site Description

The proposed development site is located at Huyton Quarry, Hale View Road, Liverpool. The proposed residential dwellings are to be erected on the land adjacent to the north of the Parcelforce Worldwide building. The M57 Motorway is approximately 300 meters to the east of the development.

To the south of the proposed development as mentioned is the Parcelforce Worldwide property. To the south west of the site is an industrial/commercial property dealing in pallets. To the west and northwest of the site is Hale View Road. North of the site is West View and Olivia Way roadways. To the northeast and east of site is a green and woodland area with a children's play park.

During site attendance, subjectively the main source of noise was road traffic from the local roads as well as the operational noise from the pallet commercial premises and Parcelforce. An exhaust duct terminates on the north façade of Parcelforce and is audible on site.



6 Noise Measurement Procedure

6.1 Personnel Present

Ben Bielicki BSc MIOA

Jonathan Spratt BSc (Hons)

6.2 Survey Equipment Used

Table 3: Survey Equipment Used			
Manufacturer	Model	Serial No.	Description
Rion	NL52	1054205	Real Time Analyser Sound Level Meter
Norsonic	Type 118	31745	Real Time Analyser Sound Level Meter
Brüel & Kjær	Type 4231	1897560	Acoustic Calibrator
Pulsar	Model 105	59964	Acoustic Calibrator

6.3 Calibration

The sound level meters were calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey. No significant drift in calibration was observed. The meters used during the survey are precision grade class 1.

Calibration certificates are available on request.

6.4 Weather Conditions

During the daytime measurement period on the 23rd January, the temperature averaged around 0°C, the sky was mostly cloudy with some broken sun. The wind speeds averaged approximately 2 m.s⁻¹ with occasional gusts which may have exceeded 5 m.s⁻¹, blowing in a primarily northeast direction. During the night time period on the same day, the temperature averaged around 1°C, with cloudy skies.

During the daytime measurement period on the 1st February, the temperature averaged around 3°C, the sky was mostly cloudy with some broken sun. The wind speeds averaged approximately 3 m.s⁻¹ with occasional gusts which may have exceeded 5 m.s⁻¹, blowing in various directions.



6.5 External Ambient Sound Measurements

The sound level meters were set to measure L_{A90} , L_{A10} , L_{Aeq} and L_{AFmax} in 5 minute periods, as well as A-weighted 1:1 octave spectrum analysis.

Full data logs and calculations are available on request.

6.5.1 Monitoring Position 1

A microphone was positioned approximately at the centre of the site 5m from the façade of Parcellforce and 5m from the corner of the nearest Parcellforce warehouse. The microphone was set on a tripod 1.5m above the ground.

6.5.2 Monitoring Position 2

A microphone was positioned at 3m from the exhausting ductwork on a tripod 1.5m above the ground to measure a sample of the resultant noise.



7 Results and Analysis

7.1 External Ambient Sound Measurement Analysis in Accordance with BS8233:2014

The following table presents the measured results from all monitoring positions.

Table 4: Measurement Results				
Monitoring position	Time Period	Time Base T (hours)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)
1	Daytime (14:00 – 17:00)	3	57.4	-
	Evening (17:00 – 23:00)	6	52.9	-
	Night time (23:00 – 07:00)	8	51.3	49.1 – 64.8
	Morning (07:00 – 08:00)	1	55.5	-

The daytime $L_{Aeq, 3hour}$ level measured between 14:00 and 17:00 hour presents the worst-case sound levels for during daytime hours and will be used for the assessment of noise at the proposed development.

7.2 Night-time L_{AFmax} Analysis

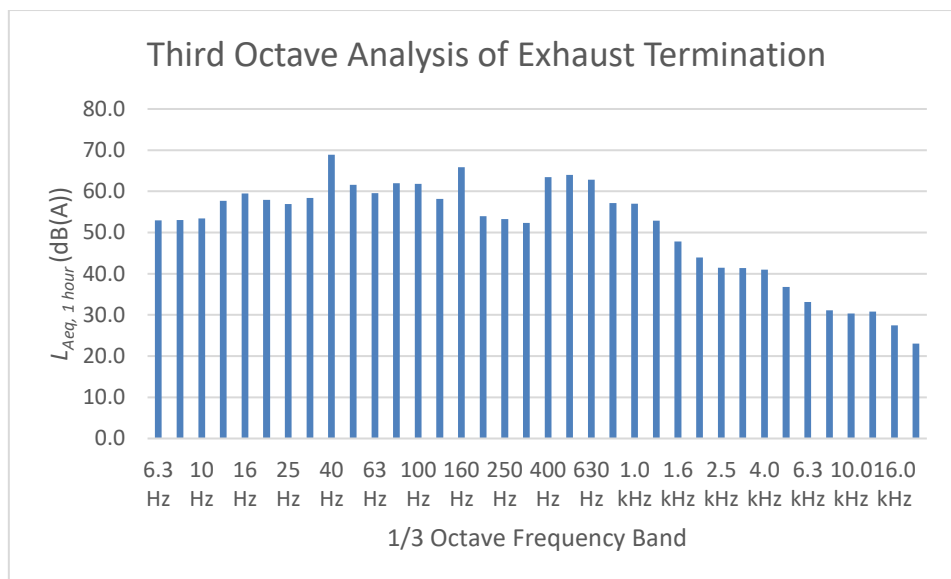
At position 1; the L_{AFmax} measured during the night time (23:00-07:00) has been analysed. It is noted that the maximum measured L_{AFmax} is 64.8 dB, which occurred at 03:50 during the night-time period. 60.0 L_{AFmax} dB is exceeded 33 times during the night time period and so this level is considered by the consultant to be typical.

The WAV file recordings indicate that the L_{AFmax} 64.8 dB event was from birdsong during the morning chorus. The next highest L_{AFmax} events are all similar activities.

WHO Community Noise Guidelines states “For a good night sleep it is believed that indoor sound pressure should not exceed approximately 45dB L_{AFmax} more than 10 – 15 times per night (Vallet & Vernet 1991).

7.3 Specific Sound Level of Exhaust Duct

Sound levels were measured at 3m from the termination of the exhaust duct on the Parcelforce warehouse façade. The specific sound level of the exhaust was measured to be 66.7dB(A) which will be taken into account for the specification of glazing and ventilation on facades that face the Parcelforce exhaust termination. The graph below shows the third octave measured $L_{Aeq, 1hour}$.



Analysis of the third-octave spectrum of the measured exhaust sound indicates that there are no tonal characteristics. Subjectively the exhaust sound was not impulsive either.



8 Recommendations

The estimated internal noise levels attributed by the external noise sources have been assessed over an average of $L_{Aeq,T}$ from the daytime and night-time survey periods and L_{AFmax} values from the night time. This along with the results from the analysis of the exhaust duct on north façade of the Parcellforce building provide the basis for the following recommendations.

8.1 Glazing & Ventilation Specification for all Habitable Rooms

The glazing specification in all habitable rooms must consist of at least 4mm glass / 12mm void / 4mm glass double glazed unit; in well-sealed frames and without trickle vents. The ventilation must be a quality mechanical system or a passive acoustic wall vent such as Greenwoods MA3051.

Although the calculations demonstrate that the wall vent can be installed on any façade; it is recommended where possible to avoid installing ventilation systems on the façade that face roads or operations at Parcellforce. Where possible, installing ventilation on quieter facades would be beneficial to the overall acoustic performance.

It is important to note that the drawing provided to Soundtesting.co.uk Ltd. *ref 1194_Proposed Site Plan SKETCH (A2) Rev A* shows no bedroom windows on the southern façade of the proposed building. Should plans change to include bedroom windows on the southern façade facing Parcellforce a more robust glazing and ventilation specification would be required.

8.2 Notes on Ventilation

The glazing and ventilation suggestions have been calculated assuming the windows are tightly closed. However it must be noted that windows are suggested to be openable to provide rapid or purge ventilation or means of escape. Noise levels in habitable rooms will exceed the recommended values with windows opened.



8.3 Calculation Methodology

The BRE Building Envelope Insulation calculator has been used for the noise break in calculations for the BS8233:2014 assessment.

The calculations are based on one vent per room. If more ventilation is required then further calculations will need be carried out.

All room dimensions used in calculations are based on drawing *ref 1194_Proposed Site Plan SKETCH (A2) Rev A* provided by the architect.

The calculations assume the external walls to be brick and block as stated in BS8233:2014.

The calculations assume each room has a reverberation time of 0.5 seconds.

The predictions also have been calculated assuming all windows are tightly closed.

8.4 Building Elements

The following table shows the expected performance of the glazing and ventilation.

Table 5: Table showing suggested Glazing & Ventilation								
Element	Description#	$R_w/D_{n,e,w}$ (dB)	Octave Centre Frequencies (Hz)					
			SRI / $D_{n,e}$ (dB)					
			125	250	500	1k	2k	4k
Glazing	4mm/(12)/4mm BS 6262 2 2005	29	21	17	25	35	37	31
Ventilation	Greenwoods MA3051	55	48	46	49	54	65	~66

**The selected units or products described have been used as a guide to form part of the specification. Other similar units or products can be used provided they can achieve the given minimum acoustic performance.*



8.5 Example of Estimated Performance

The following table compares the estimated performance values with the measured values.

Table 6: Estimated performance					
Specification	Time period	Measured External		Predicted Internal	
		Average $L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)
West/North/East Façades	Night time (23:00 – 07:00)	51.3	64.8	20.6	34.1
	Daytime (07:00 – 08:00) (16:00 – 23:00)	57.4	-	25.5	-
South Façade (Exhaust Duct Sound Dominated)	Daytime (07:00 – 23:00)	66.7	-	34.8	-



9 Conclusion

When installing the recommended glazing and ventilation detail as discussed in the recommendations section, the recommended internal noise levels described in BS8233:2014 and World Health Organisation Guidelines for Community Noise can be achieved for internal noise levels in all habitable rooms. This should satisfy the council requirement as agreed with Mr Ian Gaskell, Senior Officer for Environmental Health at Knowsley Council.



10 References

Noise Policy Statement for England (NPSE)

National Planning Policy Framework (NPPF)

BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

World Health Organisation Guidelines for Community Noise

BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures

BS EN 12758:2011 Glass in building – Glazing and airborne sound insulation

BS 6262-2:2005 Glazing in buildings – Part 2: Code of practice for energy, light and sound

www.google.co.uk/maps

10.1 Drawing References

1194_Proposed Site Plan SKETCH (A2) Rev A



Appendix

Figure 1: Aerial View of Development Showing Monitoring Positions



Figure 2: Proposed Plans Overlaid on Map Image





Figure 3: Picture Showing Monitoring Position 1





Measurement Results

Combined Measurements

