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Noise Impact Report

Client	Future Investments NW Ltd 154 East Prescott Road Knotty Ash Liverpool L14 5ND
Site Address	Land at Hale View Road Huyton Knowsley Liverpool
Survey Date	25/08/2022
Reference	20276

Quality Assurance

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Revision History

Version	Date	Editor	Notes
V1	04/10/2022	M Hamer	First issue
V2	10/11/2022	M Hamer	Revision to account for overheating as highlighted by Ian Gaskell of Knowsley Council.



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Contents

1	Introduction.....	5
1.1	An Environmental Noise Assessment.....	5
2	Assumptions, Limitations & Uncertainty.....	6
3	Planning Policies, Guidance and Criteria.....	7
3.1	National Planning Policy.....	7
3.2	Criteria.....	9
3.2.1	Local Authority Criteria.....	9
3.2.2	Covering Statement.....	9
3.2.3	Comments from Ian Gaskell 04/11/2022.....	9
3.2.4	BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.....	10
3.2.5	WHO Guidelines for Community Noise.....	11
3.3	Criteria Summary.....	11
4	Site Description.....	12
4.1	Subjective Observations.....	12
4.2	Weather.....	12
5	Noise Measurement Procedure.....	13
5.1	Personnel Present.....	13
5.2	Survey Equipment Used.....	13
5.3	Calibration.....	13
5.4	External Ambient Sound Measurements.....	13
5.4.1	Monitoring Position 1.....	13
5.4.2	Monitoring Position 2.....	14
5.4.3	Monitoring Locations Guide.....	15
6	Results and Analysis.....	16
6.1	External Ambient Sound Measurement Analysis in Accordance with BS8233:2014.....	16
6.2	Night-time L_{AFmax} Analysis.....	16
6.2.1	Night Time L_{AFmax} at Monitoring Position 1.....	16
6.2.2	Night Time L_{AFmax} at Monitoring Position 2.....	16
7	Recommendations.....	17
7.1	Glazing Specification for all Habitable Rooms.....	17
7.2	Ventilation for all Habitable Rooms.....	17



7.2.1 Notes on Ventilation17

7.3 External Amenity Space17

7.4 Calculation Methodology..... 18

7.5 Building Elements..... 18

7.6 Example of Estimated Performance..... 19

8 Conclusion..... 20

9 References.....21

9.1 Drawing References..... 21

Appendix.....22

Figure 1: Picture Showing Monitoring Positions 1 & 2.....23

Measurement Results..... 24



1 Introduction

Future Investments NW Limited has instructed Spratt and Hamer Limited to undertake an environmental noise survey in order to assess the impact from the nearby roads and commercial premises, as well as other general noise within the local environment, which may have an impact on future residents of the proposed development.

The proposed development site is an existing plot of land adjacent to Hale View Road. It is proposed to erect 2No. detached 2-storey residential dwellings.

This report is prepared solely for Future Investments NW Ltd. Spratt and Hamer 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.

1.1 An Environmental Noise Assessment

Spratt and Hamer Limited has undertaken an environmental noise assessment at the above site with noise levels measured externally over a 24-hour period, consisting of a sixteen-hour day (07:00 – 23:00) and an eight-hour night (23:00 – 07:00). The measurements were carried out during a typical week day and night period.

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.



2 Assumptions, Limitations & Uncertainty

- 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 Keith Davidson Partnership are up to date and correct.



3 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.

3.1 National Planning Policy

The National Planning Policy Framework (NPPF) July 2021 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.

174. 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.'

185. 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'



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Perception	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, 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 based on likely average response



3.2 Criteria

3.2.1 Local Authority Criteria

Planning Application Reference: 22/00087/FUL

A noise report by Soundtesting.co.uk Ltd. was issued Friday 1st February 2019 *ref 12016 Environmental Noise Report Huyton Quarry*. The application was refused by Knowsley Council due to the activity from the adjacent commercial property JK Pallets. Operations have increased over recent times and will need to be considered in the assessment. Knowsley Council noted that an application for a biomass boiler to be located at the commercial pallet premise has been submitted. The local authority has agreed that due to the current lack of information about the biomass boiler at this time its noise impact cannot be assessed. Knowsley Council do however note that there is a structure of unknown use has been erected at the JK Pallets property. Knowsley Council have requested that noise resulting from the operation of this structure will need to be considered as part of the assessment.

The following methodology has been agreed by Knowsley Council.

1. We will undertake the assessment in accordance with BS8233:2014
2. The survey will be carried out over a 24-hour period, utilising two noise monitoring locations that will be positioned at both 1.5m height and 3.5m height to account for both the ground and first floors.
3. The technical report will detail our findings as well as the mitigation strategy for glazing and ventilation.
4. Ian Gaskell (Environmental Health Officer) is happy to omit the biomass boiler from the assessment due to the lack of information available at this time, we will make note of this in the report.

3.2.2 Covering Statement

As discussed above, Knowsley Council have requested that noise resulting from the operation of the unknown structure at JK Pallets will need to be considered. At the time of writing this report, both Spratt and Hamer Ltd and Future Investments NW Ltd have attempted to make contact with JK Pallets to further understand the structure in order to make an assessment. Unfortunately, JK Pallets have not provided the requested information within the required timeframe.

Spratt and Hamer are informed that the structure is used for 'repair works', but the extent of the works, machinery used, or operational hours is unknown. During site attendance it was noted that there was noise generating from the general area of the structure, but it cant be confirmed whether this noise was from within the structure, and Spratt and Hamer have not been granted access to JK Pallets to assess further.

The following assessment will be carried out to BS8233:2014, with no specific assessment of the structure within JK Pallets. The BS8233:2014 assessment will be inclusive of all external ambient noise, including the noise generated within JK Pallets. Further assessment of the structure can only be completed when the required information is provided.

3.2.3 Comments from Ian Gaskell 04/11/2022

Since the provision of Version 1 of this report, discussions have taken place between the consultant and Ian Gaskell of Knowsley Council.

Ian has raised concerns regarding overheating and meeting the requirements of BS8233 with partially open windows.



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An email was sent to Spratt and Hamer from Ian Gaskell on 04/11/2022.

Below is a section of the email discussing overheating.

Are you able to respond to the comment from my email (see below for ease) about ventilation and preventing overheating, but at the same time not exposing the residents to levels that exceed the British Standard 8233.

We agree with the glazing specification you state (6mm-12mm-4mm) but just need some more clarification on the type of ventilation that will be installed, as the report suggests a mechanical system or passive trickle vents. Given the location, will passive vents allow for the relevant internal noise levels to be met, if the windows are open for cooling purposes (i.e. to prevent overheating). I would suggest that whole house ventilation would be the best option given then location of the proposed dwellings. Whilst the residents may still choose to open the windows, having a good mechanical system in place would provide an alternative method to prevent overheating but still ensuring the relevant noise levels are being met. If the applicant agrees to a whole house ventilation system I would suggest a condition is included with any permission granted. Should they disagree then could they please justify their decision?

Version 2 of this report will assess the potential overheating issues raised by Knowsley Council

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

The British Standard BS 8233:2014, Guidance on Sound Insulation and noise reduction for buildings, provides appropriate internal levels of noise within dwellings, flats and rooms in residential use when unoccupied.

Section 7.2.2 'Internal ambient noise levels in dwellings' of BS8233: 2014 states that 'In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4'. Table 1.3 identifies the guideline values for dwellings.

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 $L_{Aeq,8hour}$

Table 2: Indoor ambient levels for dwellings

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

Note 7 of section 7.7.2 states 'Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed up to 5 dB and reasonable internal conditions still achieved'.

In addition, Note 4 of section 7.7.2 states, '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'.

In the absence of a specific performance criterion within BS8233 for short-term noise maxima, reference can be made to guidance published by the WHO. In particular, the WHO publication 'Guidelines for Community Noise' (1999), from which the guidance given in BS8233: 2014 is itself derived, states that 'for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than ten to fifteen times per night'.



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The WHO publication 'Guidelines for Community Noise' (1999) has since been updated in 2018; however, it is widely accepted by Local Authorities that L_{AFmax} 45dB is the target level for short-term noise maxima between 23:00–07:00.

3.2.5 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.

Specific Requirement	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

Table 3: A Summary of the Guidance Noise Levels

3.3 Criteria Summary

In order to meet the requirements of Knowsley Council the assessment and recommendations will be made in reference to BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings and WHO Guidelines for Community Noise.



4 Site Description

The proposed development at Hale View Road is located in Huyton, Liverpool. The site is currently shrubland adjoining south of the intersection of Hale View Road, Olivia Way and West View. The site is bound to the south by JK Pallets, and commercial premises with a hardstanding yard area where wooden pallets are transported and stored. The east of the site is bound by a footpath which leads into the industrial estate to the south. Beyond this to the east is a plot of grassland and wooded area as part of Stadt Moers Play Area. Southeast of the site is the Parcelforce Worldwide warehouse. North of the site are residential properties fronting onto West View. Hale View Road, West View and Olivia Way are all small two lane, two-way residential access roads with relatively low traffic flow.

JK Pallets is bound by a 2m high concrete wall.

4.1 Subjective Observations

During site attendance, subjectively the main source of noise was from J K Pallets, which included vehicle movements from fork-lift trucks lifting and moving pallets. Occasional sawing and cutting was audible from the site. Passing trains and occasional aircraft were also audible.

It should be noted that whilst the main source of noise was from JK Pallets, it was not clear whether the noise was generated within the structure requiring assessment.

4.2 Weather

Description	Daytime Average	Night time Average
Temperature	16°C	15°C
Wind Speed	2.0m/s	4.0m/s
Wind Direction	S	SW
Precipitation	Dry	Dry
Any damp road/ wet ground	None	None
Any fog/snow/ice	None	None

Table 4: Weather Conditions



5 Noise Measurement Procedure

5.1 Personnel Present

Ben Bielicki BSc MIOA

5.2 Survey Equipment Used

Manufacturer	Model	Serial No.	Description
Rion	NL52	01054205	Real Time Analyser Sound Level Meter
Rion	NA-28	00211582	Real Time Analyser Sound Level Meter
Pulsar	Model 105	59964	Acoustic Calibrator
Pulsar	Model 105	86702	Acoustic Calibrator

Table 5: Survey Equipment Used

5.3 Calibration

The sound level meters were calibrated with the field calibrators 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.

5.4 External Ambient Sound Measurements

The measurement locations chosen during the survey were deemed suitable for the determination of the noise levels able to impact upon the façades of the proposed development.

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

5.4.1 Monitoring Position 1

A microphone was placed 3m above the ground floor surface on a tripod, in order to understand the sound levels at the first storey of a dwelling. The meter was located near to the boundary wall of J K Pallets. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 60 dBA.



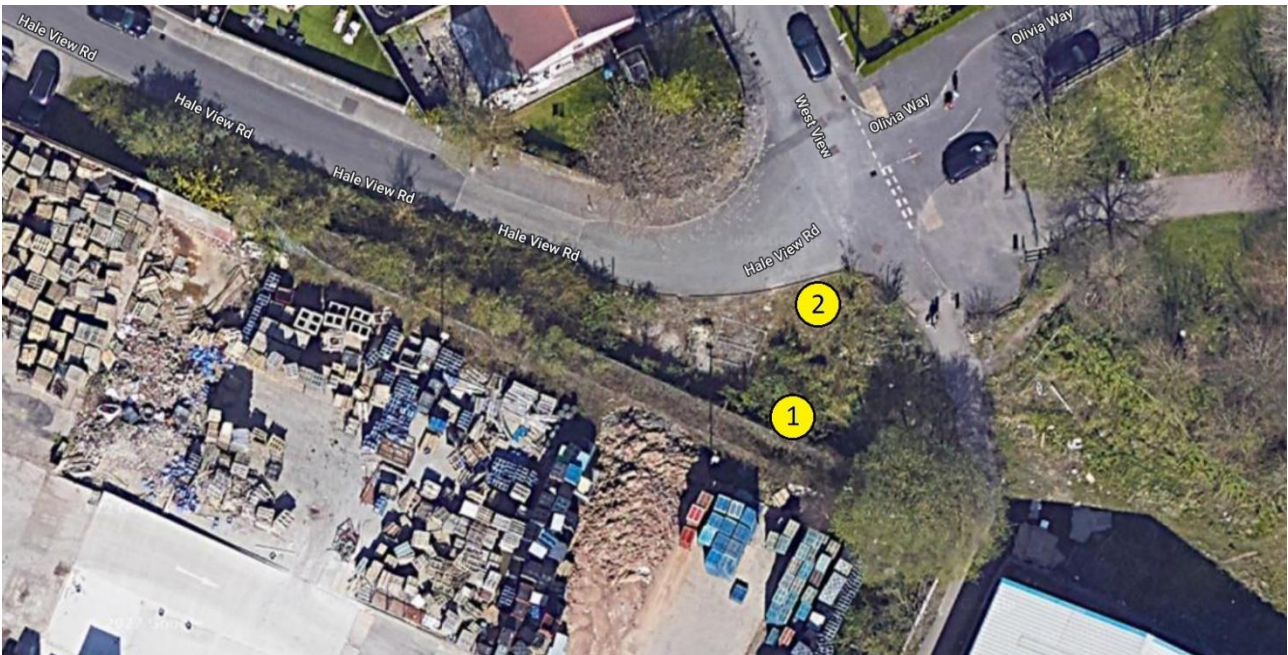
5.4.2 Monitoring Position 2

A microphone was placed 1.5m above the ground floor surface on a tripod, in order to understand the sound levels at the ground floor of a dwelling. The meter was located 4m from the boundary wall of J K Pallets. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 60 dBA.



5.4.3 Monitoring Locations Guide

The image below shows the location positions of the meters.



6 Results and Analysis

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

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

Monitoring position	Time Period	Time Base T (hours)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	L_{A90} (dB)	L_{A10} (dB)
1	Daytime	16	51.7	-	45.1	52.0
	Night time	8	46.7	45.0 – 71.8	41.9	46.9
2	Daytime	16	50.1	-	44.2	51.1
	Night time	8	47.1	44.9 – 73.6	41.2	47.1

Table 6: Measurement Results

6.2 Night-time L_{AFmax} Analysis

The L_{AFmax} measured during the night-time (23:00–07:00) has been analysed. 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).

6.2.1 Night Time L_{AFmax} at Monitoring Position 1

The maximum measured L_{AFmax} is 71.8 dB, which occurred at 23:05. The next highest L_{AFmax} is 68.7 dB, which occurred at 06:20. L_{AFmax} 70.0 dB is exceeded only once and L_{AFmax} 60.0 dB is exceeded seventeen times during the night-time period.

The WAV file audio recordings suggest that the highest measured L_{AFmax} event of 71.8dB was from a high frequency event, most likely an animal ‘squealing’ and therefore not a manmade noise source. The WAV file audio recordings and frequency spectrum data indicate that the L_{AFmax} 68.7 dB event was from aircraft flying over.

The L_{AFmax} 68.7 dB event will be used for the assessment at this monitoring position as this is considered representative of other L_{AFmax} events during the night-time period.

6.2.2 Night Time L_{AFmax} at Monitoring Position 2

The maximum measured L_{AFmax} is 73.6 dB, which occurred at 23:05. The next highest L_{AFmax} is 67.7 dB, which occurred at 23:20. L_{AFmax} 70.0 dB is exceeded only once and L_{AFmax} 60.0 dB is exceeded seventeen times during the night-time period.

The WAV file recordings and frequency spectrum data show that the highest measured event and timing matches up with Position 1. The WAV file recordings and frequency spectrum data show that the second highest measured event of L_{AFmax} 67.7 dB was from traffic noise.

The L_{AFmax} 67.7 dB event will be used for the assessment at this monitoring position as this is considered representative of other L_{AFmax} events during the night-time period.



7 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 building element evaluation provide the basis for the following recommendations.

7.1 Glazing Specification for all Habitable Rooms

The glazing specification in all habitable rooms must consist of at least 6mm glass / 12mm void / 4mm glass double glazed unit; in well-sealed frames.

7.2 Ventilation for all Habitable Rooms

The ventilation in all habitable rooms should be a quality mechanical system.

7.2.1 Notes on Ventilation

Acoustics, Ventilation and Overheating Version 1.1 January 2020 states in Section 3.24:

“it is assumed that a partially open window will provide an outside to-inside level difference of 13 dB. This level difference is considered representative of typical domestic rooms” with simple façade openings of around 2% of the floor area”.

When considering the 13 dB outside-to-inside level difference rule, the internal levels within the dwellings would breach BS8233. Therefore, the above recommendations show that all plots should be ventilated with mechanical ventilation.

Where mechanical ventilation is utilised, the system is to be designed by a suitably qualified engineer or M&E consultant. The system shall be designed so the sound levels from any external plant or inlet/outlets do not exceed the background noise level at any noise receptor, i.e. outside a neighbouring window. This may require further assessment once the type and location of system has been specified.

7.3 External Amenity Space

The architect's drawings show gardens surrounding the two plots fronting Hale View Road. Monitoring position 2 has been used to determine the daytime $L_{Aeq,16hour}$ within the proposed gardens.

During the daytime, the gardens experience an $L_{Aeq,16hour}$ of 50.1dB which is marginally over the WHO Guideline values for moderate annoyance ($L_{Aeq,16hour}$ 50dB) but below the level for serious annoyance, which is an acceptable level within the amenity space.



7.4 Calculation Methodology

The BRE Building Envelope Insulation calculator has been used for the noise break in calculations for the BS8233:2014 assessment which is based on the rigorous calculation method of BS8233:2014 and BS EN 12354-3.

All room dimensions used in calculations are based on drawings provided by the architect.

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

The calculations assume each living room has a reverberation time of 0.5 seconds, and each bedroom has a reverberation time of 0.4s.

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

7.5 Building Elements

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

Element	Description*	$R_w/D_{n,e,w}$ (dB) (C;Ctr)	Octave Centre Frequencies (Hz)					
			SRI / $D_{n,e}$ (dB)					
			125	250	500	1k	2k	4k
Glazing	6mm glass/ 12mm void/ 4mm void (BS 6262- 2:2005)	32 (-2;-4)	23	21	24	39	36	40

Table 7: Table showing suggested Glazing

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.



7.6 Example of Estimated Performance

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

Area	Time period	Measured External		Predicted Internal	
		Average $L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)
Bedrooms	Night time (23:00 – 07:00)	47.1	73.6	14.1	25.6
Living Rooms	Daytime (07:00 – 23:00)	51.7	-	20.3	-
External Amenity Space	Daytime (07:00 – 23:00)	50.1	-	-	-

Table 8: Estimated performance



8 Conclusion

When installing the recommended glazing and ventilation detail as discussed in this report, the target internal noise levels described in BS8233:2014 can be achieved for internal noise levels in all habitable rooms, and external amenity spaces.



9 References

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

9.1 Drawing References

1514 Hale View Road 100 Existing and Proposed Site P_1574263061

1514 Hale View Road 101 Proposed Plans and Elevation_1574263061

1514 Hale View Road 102 Proposed Plans and Elevation_1574263061



Appendix

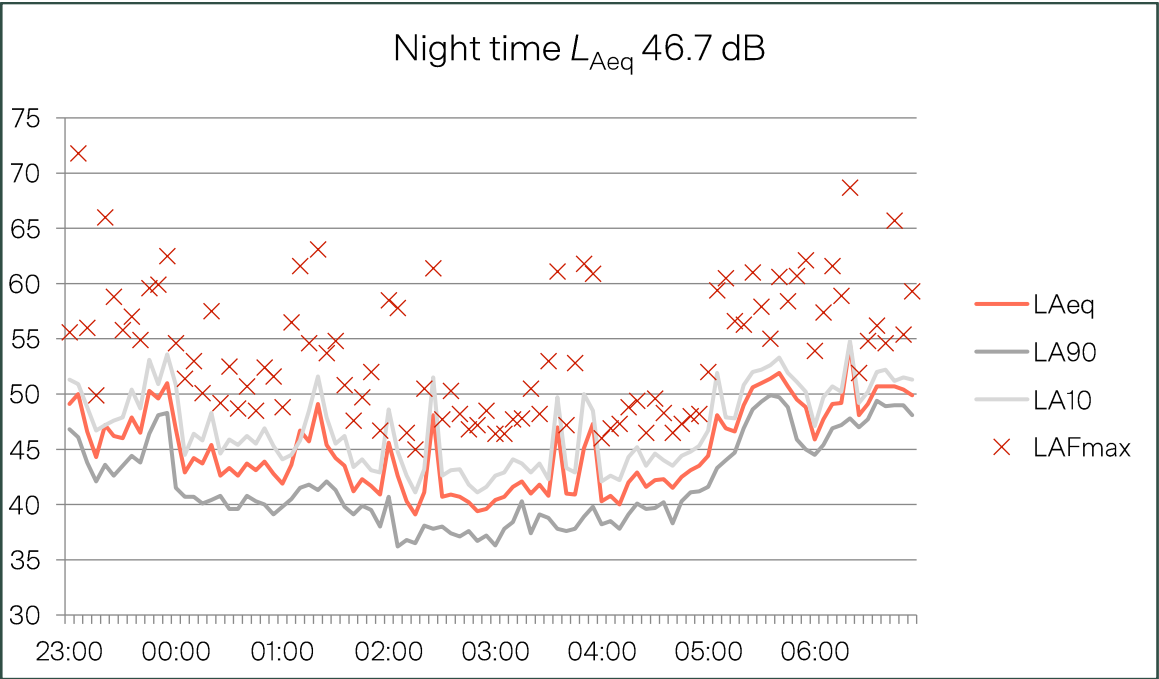
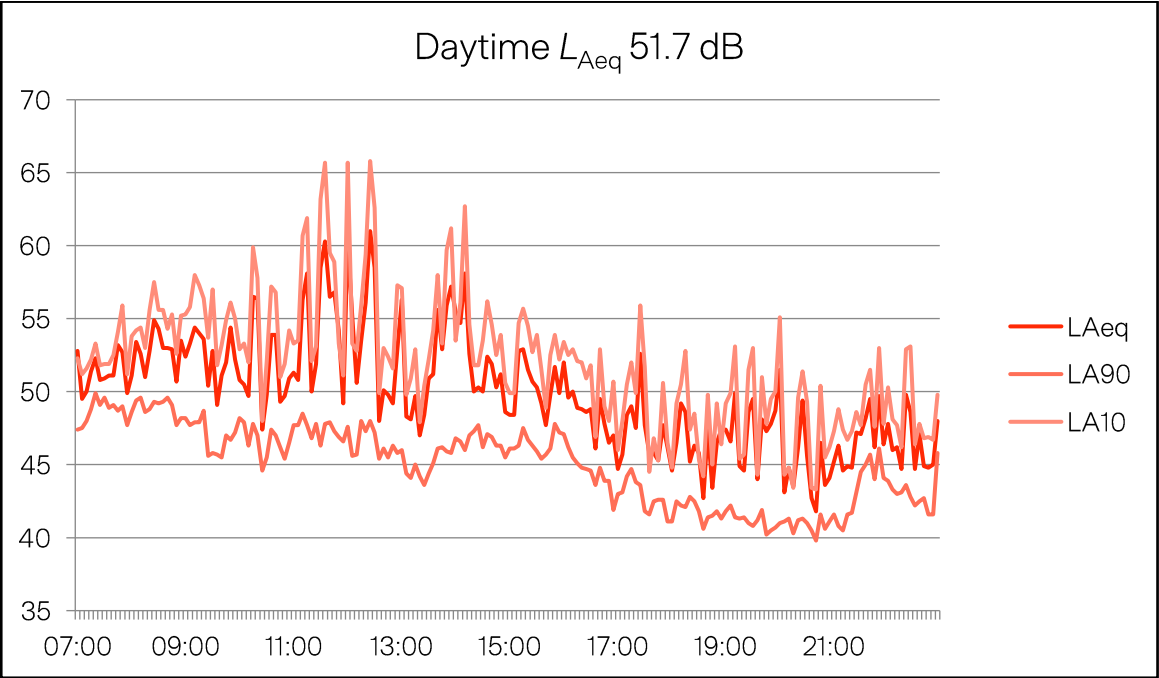


Figure 1: Picture Showing Monitoring Positions 1 & 2

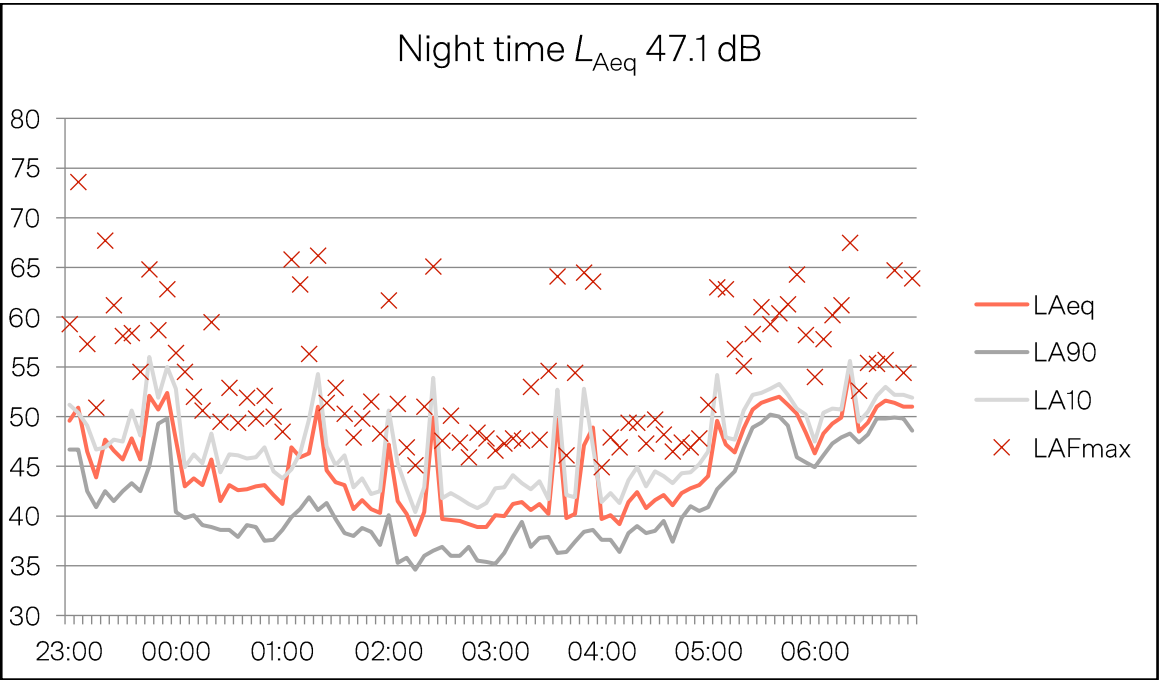
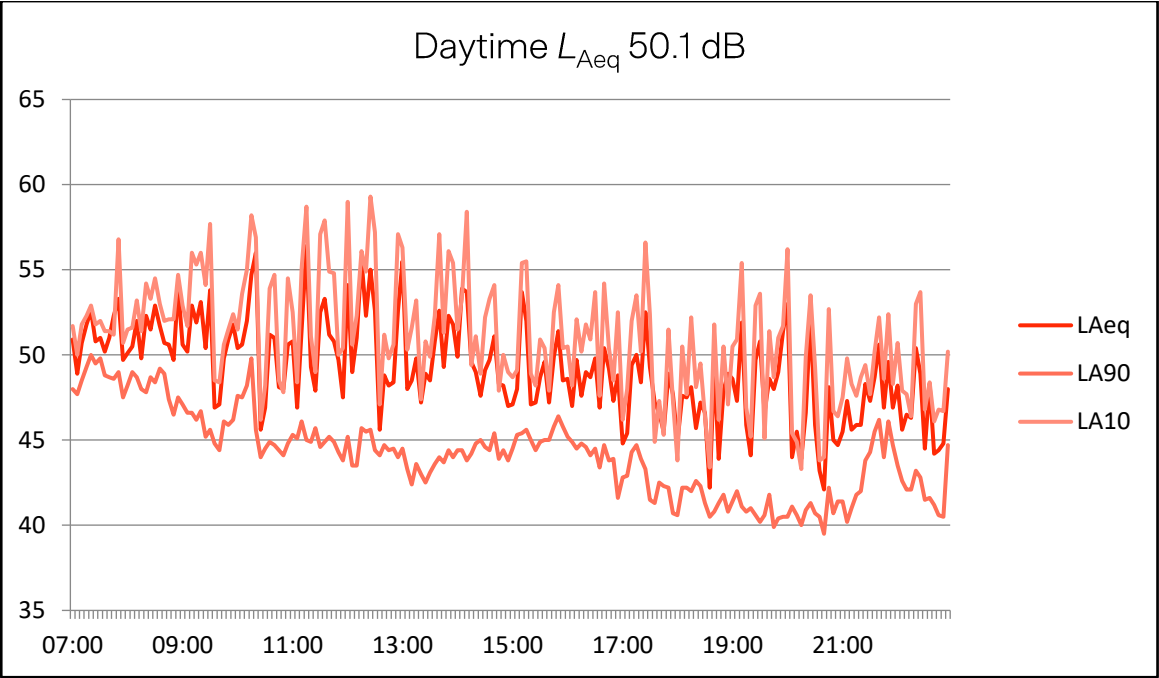


Measurement Results

Monitoring Position 1

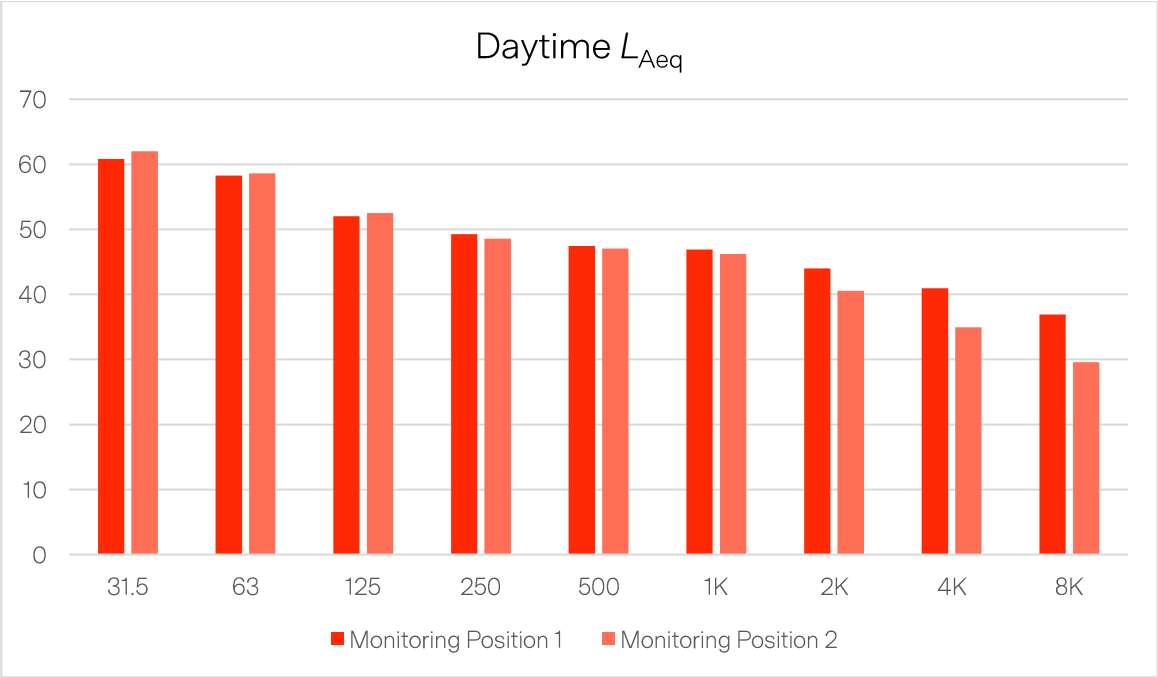


Monitoring Position 2

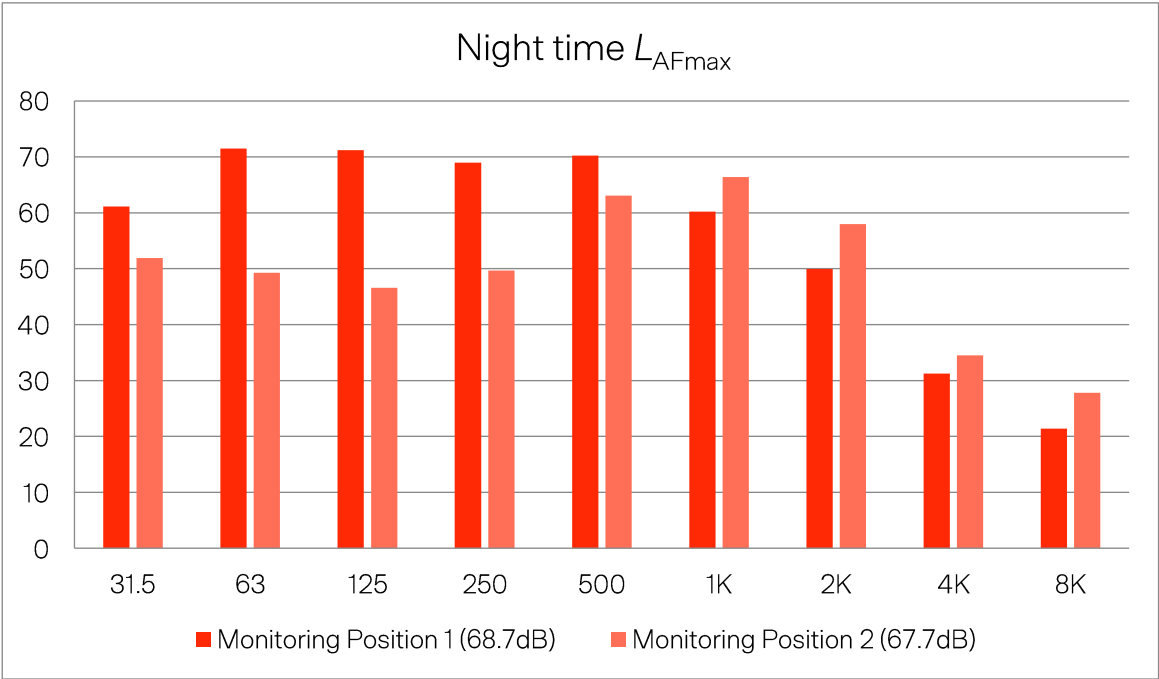


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Un-weighted 1:1 Octave Results



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Glossary of Acoustical Terms

A-weighting

Noise levels are corrected to represent human response to sound.

L_{Aeq}

This is a continuous equivalent of time varying noise, or effectively the average measured (A weighted) noise level over a defined period of time.

$L_{Aeq,16hour}$

A 16 hour long measurement of the L_{Aeq} over the period between 07:00 and 23:00, also known as a daytime measurement.

$L_{Aeq,8hour}$

An 8 hour long measurement of the L_{Aeq} over the period between 23:00 and 07:00, also known as a night time measurement.

L_{AFmax}

The highest, or maximum A-weighted sound pressure level measured over a specified time period. The 'F' defines a time weighting in Fast.

L_{A90}

The A-weighted noise level or average level which is exceeded for 90 percent of the measured time period. Also known as a background level.

L_{A10}

The A-weighted noise level or average level which is exceeded for 10 percent of the measured time period.

1:1 & 1:3 octave spectrum analysis

A single measurement that is separated into frequency bands to allow for a more detailed analysis of the noise source in question.



R_w

The weighted sound reduction index of a partition or facade. A single number value based on the performance of a partition between two rooms across the frequency range 100Hz to 3150Hz. The level is adjusted for the effects of reverberation and background noise.

$D_{n,e,w}$

The weighted level difference of a partition or façade which takes into account a small element such as a grill or vent.

SEL (sound exposure level)

A measure of A-weighted sound energy used to describe a particular event, such as a train pass. It is the sound energy, which, if occurring over one second would contain the same energy as the event.

Free field sound pressure

Is where the radiation or spread of sound is completely unaffected by the presence of any reflecting surfaces or boundaries.

Low Frequency Noise

A term generally used for sound below a frequency of 100 to 150Hz.





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