NoiseAssess

Acoustics, Noise and Vibration Consultants

Proposed residential development

Upper Hoyland Road, Hoyland, Barnsley
Noise Assessment

Our Reference: 11784.01.v1
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On behalf of: ECUS Ltd

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1.0 INTRODUCTION

1.1 Scope of Report:

This report relates to the potential impact of existing noise sources on the proposed dwellings and associated external amenity areas.

1.2 Site Location:

The existing site is shown on Figure 1. Dearne Valley Parkway runs parallel to the northern boundary with open fields to the east and west of the site and residential properties to the south and southeast. There are also some working farm buildings beyond residential areas to the south and southeast and an industrial unit beyond a field to the east. The existing ground level of the northern boundary of the site is above the level of Dearne Valley Parkway by around 1.5m and the existing ground level at the southern boundary is around 6m above the existing ground level at the northern boundary. There is an embankment between the site and the field to the east which increases in height going north. On top of the embankment there is a track which leads off Upper Hoyland Road to the southeast of the site and passes over the Dearne Valley Parkway on a bridge to the northeast of the site.

1.3 Proposals:

The proposed site layout is shown on Figure 2. It consists of 5 detached houses alongside Upper Hoyland Road to the south and southeast; 5 detached properties in the centre and northeast of the site with access off a private driveway and gardens along the northern boundary with Dearne Valley Parkway; 4 semi-detached houses facing Upper Hoyland Road to the northwest and west. The plans and elevations of the proposed properties are shown on Figures 3-6.

1.4 Planning Authority:

Planning Authority:	Barnsley Metropolitan Borough Council
Consultee on Noise:	Environmental Health, Barnsley Metropolitan Borough Council
Contact(s):	James Gardham
Consultation:	Discussion of normal noise criteria used by the Local Authority for the assessment or residential planning applications.

2.0 NOISE SURVEY

2.1 The noise survey times, location and instrumentation are detailed in Table 1 below. The noise monitoring location is shown on Figure 1.

Table 1. Summary of noise survey times, locations and instrumentation

Survey Method	Unattended
Start time	18/02/2016 17:00 hrs
End time	19/02/2016 12:00 hrs
Location	In a free field location on northern boundary with Dearne Valley Parkway, 1.5m above ground level, approximately 15m from northwestern end of Upper Hoyland Road and 15m from Dearne Valley Parkway
Representative of	Garden boundary of closest properties
Meter **Class / Type** **Serial number**	Rion NL-52 Class 1 00732142
Portable calibrator **Serial number**	Norsonic 1251 32860
Frequency Analysis	1/3 Octave

2.2 The sound level meter used for the measurements was calibrated using the portable calibrator detailed in Table 1 at the start and end of the survey period. There was no variation in the calibration level.

2.3 The noise survey results are summarised in Table 2 and the full results of the noise surveys are given in Appendix A2. The dBL_{Aeq} values in Appendix A2 and Table 2 are the log-averages of the 5-minute readings taken during the monitoring periods. The dBL_{A90} values in Appendix A2 are the arithmetic average of the 5-minute readings.

2.4 It should be noted that the noise monitoring location was on the boundary and therefore the results are higher than those which will occur at the proposed properties. The readings have been used to calculate the noise levels at the proposed properties.

Table 2. Summary of noise survey results - free field noise levels

Period	Parameter	Noise level
Daytime	$dBL_{Aeq\ 11hr*}$	73
	Highest $dBL_{Aeq\ 1hr}$	75
Night-time	$dBL_{Aeq\ 8hr}$	67
	Highest $dBL_{Aeq\ 15min}$	75

*17:00-23:00 and 07:00-12:00.

2.5 The main noise source during the periods of attendance on site was road traffic on Dearne valley Parkway and that is likely to have been the main noise sources throughout the noise survey.

2.6 Weather conditions during the noise survey:

Weather forecast/reports indicate that the survey period was dry with light winds (<5m/s). An environmental windshield was used throughout the survey to protect the microphone from the weather.

3.0 ASSESSMENT AND RECOMMENDATIONS

Assessment criteria

3.1 PPG24[1] which was previously referred to in relation to planning noise issues is no longer current following the publishing of the NPPF[2] and the NPPG[3]. There are no noise criteria figures quoted in the NPPF / NPPG and it has been left to local authorities to agree their own criteria. This assessment and recommendations have been based on the local authority's normal noise limiting criteria as follows.

Living rooms and bedrooms 07:00 to 23:00 hours	35 $dBL_{Aeq(16\text{-}hour)}$
Bedrooms 23:00 to 07:00 hours	30 $dBL_{Aeq(8\text{-}hour)}$
External amenity areas	55 $dBL_{Aeq(16\text{-}hour)}$

3.2 These criteria are in line with the recommended indoor ambient noise level for dwellings as outlined in BS8233:2014[4] and shown in Table 3 below. The adoption of these criteria was agreed in advance with the Environmental Health Officer.

Table 3. BS8233 recommendations for internal ambient noise levels

Activity	Location	07:00-23:00 hrs	23:00-07:00 hrs
Resting	Living room	35 $dBL_{Aeq,16\ hour}$	-
Dining	Dining room/area	40 $dBL_{Aeq,16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 $dBL_{Aeq,16\ hour}$	30 $dBL_{Aeq,8\ hour}$

3.3 Paragraph 7.7.3.2 of BS8233 recommends that for traditional external amenity areas such as gardens and patios, it is desirable that during the daytime the external noise level does not exceed 50 $dBL_{Aeq,T}$ with an upper guideline value of 55$dBL_{Aeq,T}$ which would be acceptable in noisier environments. The time period is not stated but is assumed to be 16 hours (07:00 hours to 23:00 hrs) as in the previous version of BS8233. It is understood that the Local Authority normally adopts the 55 $dBL_{Aeq(16\text{-}hour)}$ criterion for garden areas.

3.4 No specific numerical criterion is given for individual events in BS8233:2014. A dBL_{Amax} criterion for bedrooms is sometimes adopted by Local Authorities but the Environmental Health Officer indicated that Barmsley MBC does not normally request the use of a dBL_{Amax} criterion for road traffic noise.

3.5 Recommendations to meet the above criteria are given below.

External Amenity Areas

3.6 There are gardens proposed to the rear of the detached and semi-detached houses. The noise levels in the gardens of the 5 detached houses proposed for alongside Upper Hoyland Road to the south and southeast will be reduced by incidental screening provided by the 5 detached properties in the centre and northeast of the site and the 4 semi-detached houses facing Upper Hoyland Road to the northwest and west. However, the noise levels in the gardens along the northern boundary with Dearne Valley Parkway and others with little screening, especially around the perimeter of the site, are expected to be above the criterion for external amenity areas. Therefore it is recommended that a 4m high acoustic barrier be installed along the northern boundary and north-eastern boundary as shown in red on Figure 9. Also, an additional 3m high acoustic barrier should be installed along the western boundary at the south-western corner of the site as shown in purple on Figure 9. With the barriers in place daytime (07:00-23:00 hrs) noise levels within the gardens will be at or below the BS8233 upper limit of 55 dB $dBL_{Aeq,16hr}$.

3.7 The acoustic barriers may be close boarded weather treated timber fences (min 18mm thick) with cover strips over the gaps between panels and gravel boards to seal the gap at the base. Alternatively masonry walls could be used.

3.8 It should be noted that the barrier calculations have been based on the northern boundary with Dearne Valley Parkway, which is the lowest part of the site, being 1.5m above the road level. The required barrier height is 4m above the boundary level and therefore the top of the 4m barrier will be approximately 5.5m above the Dearne Valley Parkway road level. It has been assumed that the ground level at the northern boundary will not be reduced below 1.5m above the road level. If the ground level of the site is increased the required barrier height will still be around 4m above the garden level at the northern boundary but proposed level changes can be checked during the detailed design. The top of

the barrier at the southwestern corner of the site should be 3m above the level of the adjacent garden and should follow the slope of the garden as it rises.

3.9 If the proposed 4m barrier is not feasible consideration could be given to providing a part of each garden with lower noise levels (for sitting out) with other parts having higher noise levels. This approach would need to be discussed with the Local Authority. The approach would be generally in line with the NPPG[3] which indicates that noise impact may be partially off-set if residents have access to a relatively quiet external amenity space. The guidance does not state that the whole of the garden needs to be below a certain noise level. For instance, a patio or sitting out area could be formed at a higher ground level to the north of the properties with a barrier immediately to the north of it. Such a barrier may not need to be as high as 4m to reduce noise levels to below 55 dBL_{Aeq} in the small sitting out area (the height required would depend on the proposed ground level in the sitting out area and the proposed ground level at the barrier position). There could then be steps down into a lower section of garden near the road which would have higher noise levels if the height of the proposed 4m boundary barrier were reduced. However this approach may be more difficult to apply to the gardens of the semi-detached houses.

3.10 It should be noted that the recommendations for the building envelope construction given below are calculated from modelling of noise levels on the site including the proposed barriers shown on Figure 9 and the effect of the proposed layout and assumed ground levels. If the barriers are not implemented in full or the layout or ground levels are changed then the proposed building envelope recommendations would need to be reviewed.

External wall construction

3.11 It has been assumed that the external walls of the new properties will be of cavity masonry construction (e.g. brickwork outer leaf and solid dense blockwork inner leaf) which is expected to provide sufficient sound insulation. Other external wall constructions (e.g. timber frame, rainscreen cladding, etc.) should be checked with an acoustic consultant.

Roof construction

3.12 The proposed houses are shown without rooms in the roofs. This design should be used unless further checks are carried out by an acoustic consultant. It has been assumed that the external roof construction will be roofing tiles on felt. The internal plasterboard ceilings to the upper floor rooms should be a minimum of 2 layers of 15mm dense plasterboard or 3 layers of 12.5mm standard Wallboard plasterboard. A minimum of 100mm mineral wool insulation should be placed over the ceilings in the roof void/loft.

3.13 Where 15mm thick dense plasterboard is referred to above this means plasterboard with a minimum weight of approximately 12.6 kgm^{-2}. Where 12.5mm thick standard Wallboard is specified this means plasterboard with a minimum weight of approximately 8.5 kgm^{-2}. Typical dense plasterboards include:

i) British Gyspum: 'Soundbloc'
ii) Knauf: 'Soundshield'
iii) Siniat: 'dBCheck'

3.14 Where mineral wool is mentioned above suitable products include Isover APR 1200 or URSA Acoustic Roll or Rockwool Flexi.

Glazing

3.15 The recommended glazing to all living rooms and bedrooms throughout the development a minimum performance of 31 dB R_w. This performance is normally achieved with standard thermal double glazed sealed units (e.g. two panes of 4mm glass separated by a minimum cavity of 10mm).

Ventilation

3.16 The following rooms should have specialist acoustic vents with a minimum performance of 45 dB $D_{n,ew}$, as detailed in Appendix A3:

- Living rooms and bedrooms in all elevations of the semi-detached houses Type C in the northwestern part of the site.
- Living rooms and bedrooms with windows on the elevations facing towards Dearne Valley Parkway in the five detached houses (Types A+ and B) closest to Dearne Valley Parkway in the northern part of the site.

3.17 The following rooms should have specialist acoustic vents with a minimum performance of 40 dB $D_{n,ew}$, as detailed in Appendix A3:

- Living rooms and bedrooms with windows on the elevations facing away from Dearne Valley Parkway in the five detached houses (Types A+ and B) closest to Dearne Valley Parkway in the northern part of the site.
- Living rooms and bedrooms with windows on the elevations facing towards Dearne Valley Parkway in the five detached houses (Types A, A+ and B) furthest from Dearne Valley Parkway in the southern part of the site.

3.18 The remaining rooms may have standard window frame trickle vents:

- Living rooms and bedrooms with windows on the elevations facing away from Dearne Valley Parkway in the five detached houses (Types A, A+ and B) furthest from Dearne Valley Parkway in the southern part of the site.

General Comments

3.19 All glazing should achieve a good seal when closed. The example glazing specification given above is indicative and for information only. The windows installed should have manufacturer's test data confirming compliance with the dBR_w value indicated. The glass specification may need to be enhanced for other reasons.

3.20 The acoustic vents specified above are to replace the normal trickle vents in the windows and the rooms where enhanced acoustic vents are specified should not have standard trickle vents in the windows.

3.21 The recommended minimum acoustic ventilation performance figures given above are applicable where 1 vent is sufficient to provide adequate airflow within the room. If more than one vent is required then the required performance for each individual vent must be increased by 10xlog(n) where n is the number of vents in the room. Please see Appendix A3 for more information.

3.22 The recommendations in this report are given for acoustic reasons only and advice on other matters should be obtained from other specialists. It is the Client's responsibility to check with the manufacturer that all products chosen are suitable for the proposed use. The safety implications of the installation of any products used should be checked by the contractor before use and appropriate systems of work put in place. Heavier products are often preferable from the acoustic point of view. However, where it is considered that appropriate safe systems of work cannot be implemented for such products then alternatives should be agreed in advance of construction.

3.23 The recommendations provided in this report are based on the noise levels measured during the survey. The survey measurements are considered to be representative of the area although there may be some variation in noise levels due to local events, seasons etc.

4.0 CONCLUSIONS

4.1 A noise survey and assessment has been carried out for a proposed residential development on a site off Upper Hoyland Road in Hoyland Barnsley.

4.2 The most significant noise source at the site was road traffic on the Dearne Valley Parkway to the north.

4.3 The proposed development consists of 10 detached houses and 4 semi-detached houses with private gardens.

4.4 Recommendations have been made for acoustic barriers to meet the noise level criteria for external amenity areas agreed with the Local Authority.

4.5 Building envelope recommendations have been made to meet the noise level criteria normally required by the local authority.

4.1 The assessment demonstrates that the development can be designed to meet the Local Authority's required noise criteria and therefore, if the measures are implemented, noise should not be a reason to refuse permission for the proposed development.

5.0 REFERENCES

1. PPG24: Planning Policy Guidance 24, Department of the Environment, 1994.

2. Department for Communities and Local Government, March 2012. National Planning Policy Framework.

3. Department for Communities and Local Government, Planning Practice Guidance on noise (2014). Obtained from: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/ accessed 17/10/2015.

4. BS8233: British Standard 8233, Guidance on sound insulation and noise reduction for buildings, BSI 2014.

FIGURE 1: SITE AND NOISE MONITORING LOCATION

FIGURE 2: PROPOSED SITE LAYOUT

FIGURE 3: PROPOSED HOUSE TYPE 'A+'

FIGURE 4: PROPOSED HOUSE TYPE 'A'

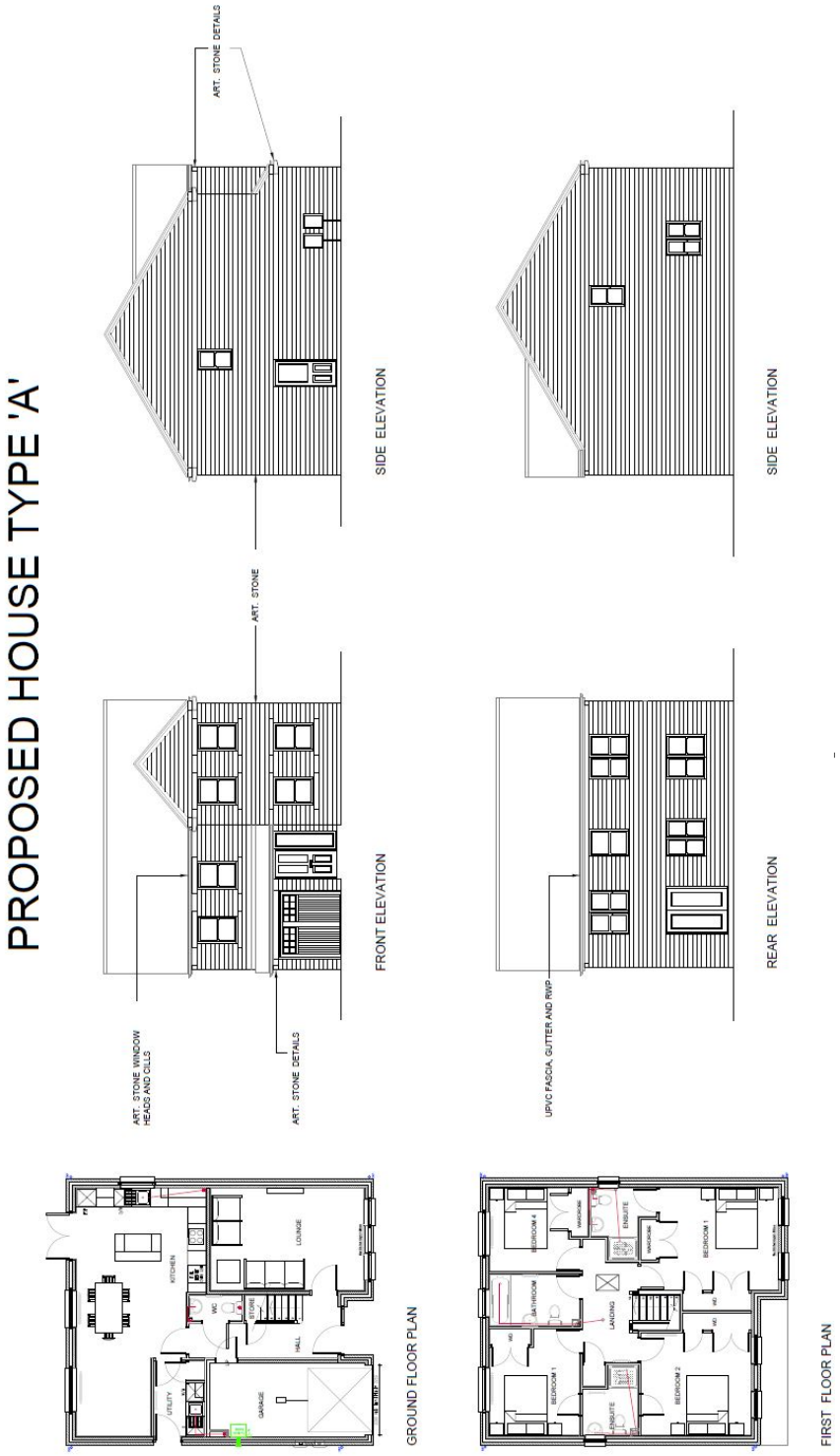

FIGURE 5: PROPOSED HOUSE TYPE 'B'

FIGURE 6: PROPOSED HOUSE TYPE 'C'

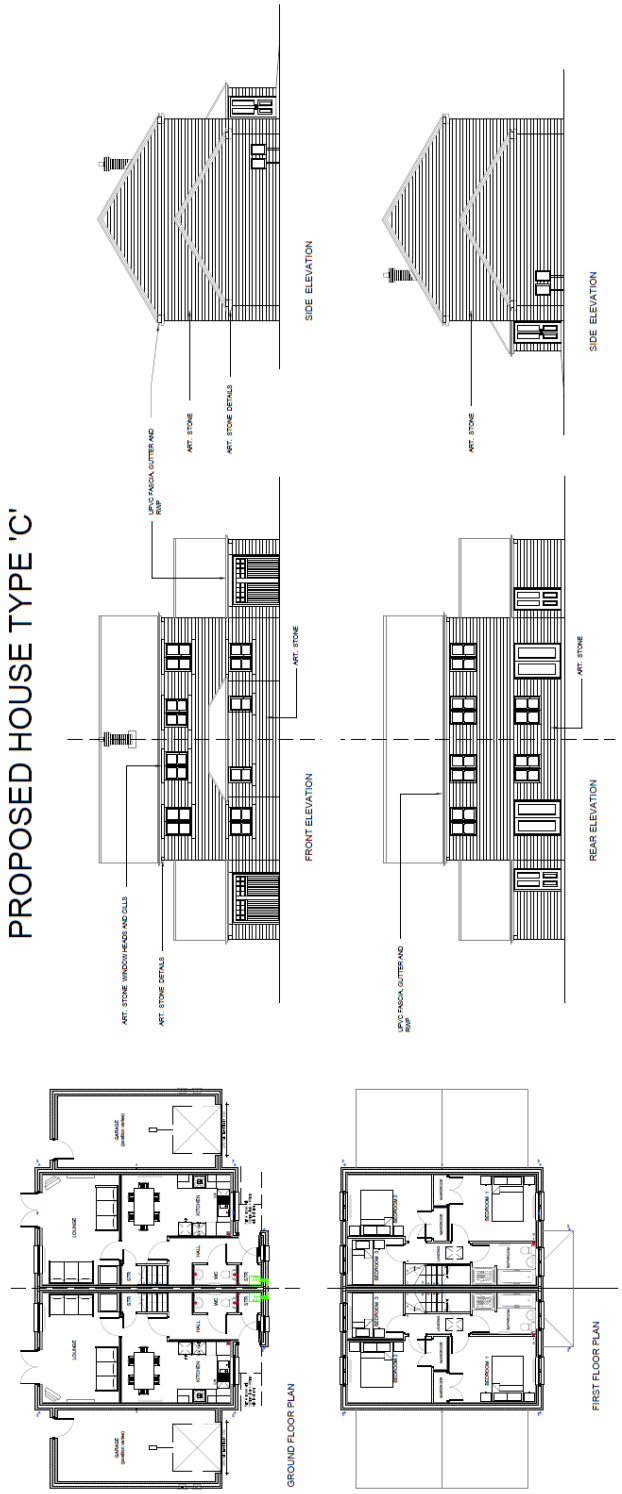

FIGURE 9: PROPOSED ACOUSTIC BARRIER LOCATIONS

APPENDIX A1: ACOUSTIC TERMINOLOGY

Ambient noise	The sound pressure level at a given location (i.e. sound from all sources) usually measured using the L_{Aeq} parameter.
A-weighting	A weighting applied to the frequencies which make up a sound pressure level to mimic the response of the human ear which is less responsive to low frequency sounds as it is to high frequency sounds. The resultant level after application of the weighting is called the 'A-weighted sound pressure level' and is denoted by dB(A) or by using a subscript A (e.g. dBL_{Aeq}).
Background noise	The noise measured in the absence of the noise under investigation usually using the statistical parameter L_{90} which represents the quietest parts of the measurement period.
Broadband sound	Sound which contains all the frequencies.
Decibel (dB)	A logarithmic measurement scale used for sound pressure levels. This scale is used because the simple use of sound pressures would be unwieldy as the range of pressures to which the human ear responds is very large. The normal threshold of hearing at 1kHz is 0dB. A level of $120dBL_{Aeq}$ is very loud (L signifies level and the A and eq are explained under A-weighting and L_{eq}). Some night club dance floors can have sound levels of around 110 dBL_{Aeq}. In the workplace the wearing of hearing protection is compulsory for staff who experience a noise level of over $85dBL_{Aeq}$ averaged over an 8-hour day and is normally used when the levels are over $80dBL_{Aeq}$ averaged over the 8-hour day. Noise intrusion levels into bedrooms (e.g. from traffic noise) are often controlled to below $30dBL_{Aeq}$ in the design of new properties (standards sometimes vary between authorities). Noise levels of below $20dBL_{Aeq}$ are very quiet and would normally only be achieved in a well designed recording studio. Although noise calculations are normally carried out using figures to 1 decimal place the results are often presented to the nearest dB as changes of a fraction of a dB are not normally perceptible even in controlled conditions.
Facade noise level	Noise level including a contribution from the reflection from a building facade, usually measured at 1m from the facade.
Free field	Noise levels with no contribution from reflections from nearby structures.
Hertz	The units used for frequency denoted by Hz, i.e. the number of cycles of pressure fluctuation per second. K used in front of Hz represents 1000 (1kHz = 1000Hz). High frequency sounds (e.g. 8kHz) are high pitched and low frequency sounds (e.g. 63Hz) are the bass notes.

L_{eq}	A parameter used to denote the 'equivalent continuous sound pressure level'. This is the sound pressure level of a continuous sound that would contain the same energy as the varying sound being measured or investigated. L_{Aeq} is the parameter used to denote the 'A-weighted equivalent continuous sound pressure level' (see A-weighting).
L_{10}	A statistical parameter often used for the measurement of road traffic noise. It is the level exceeded for 10% of the time period being considered. If A-weighted a subscript A is included and the time period can also be included in subscript, e.g. $L_{A10,\ 1hour}$.
L_{90}	A statistical parameter often used for the measurement of background noise levels. It is the level exceeded for 90% of the time period being considered. If A-weighted a subscript A is included and the time period can also be included in subscript, e.g. $L_{A90,\ 5min}$.
L_{max}	The maximum noise level which occurred during the monitoring period. $L_{Amax,f}$ denotes the maximum A-weighted sound pressure level using the fast time constant of 125ms.
Loudness	Although a 3dB increase is equivalent to a doubling of the sound power level of a sound source this increase is the minimum perceptible under normal conditions. It takes a 10dB change in noise level for it to sound roughly twice (or half) as loud subjectively.

APPENDIX A2: NOISE SURVEY RESULTS

Daytime survey results

Table A2.1: Daytime Noise Survey Data
Thursday 18 Feb 2016

Date	Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)		
			L_{Aeq}	$L_{Amax(f)}$	L_{A90}
18/02/2016	17:00:20	01:00:00	74.6	84.3	68.3
18/02/2016	18:00:20	01:00:00	72.9	82.9	65.1
18/02/2016	19:00:20	01:00:00	71.1	83.2	59.8
18/02/2016	20:00:20	01:00:00	69.6	93.4	56.3
18/02/2016	21:00:20	01:00:00	68.1	81.6	52.8
18/02/2016	22:00:20	01:00:00	66.8	85.0	46.9
AVERAGE			71.3	-	58.2
HIGHEST			74.6	93.4	68.3
LOWEST			66.8	81.6	46.9

Table A2.2: Daytime Noise Survey Data
Friday 19 Feb 2016

Date	Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)		
			L_{Aeq}	$L_{Amax(f)}$	L_{A90}
19/02/2016	07:00:20	01:00:00	75.2	83.0	68.7
19/02/2016	08:00:20	01:00:00	75.0	85.0	68.2
19/02/2016	09:00:20	01:00:00	73.3	82.9	64.2
19/02/2016	10:00:20	01:00:00	72.6	82.5	63.2
19/02/2016	11:00:20	01:00:00	73.0	93.7	63.5
AVERAGE			74.0	-	65.6
HIGHEST			75.2	93.7	68.7
LOWEST			72.6	82.5	63.2

Night-time survey results

Table A2.3: Night time Noise Survey Data
Thursday 18 Feb 2016 to Friday 19 Feb 2016

Date	Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)		
			L_{Aeq}	$L_{Amax(f)}$	L_{A90}
18/02/2016	23:00:20	00:15:00	63.6	79.7	44.1
18/02/2016	23:15:20	00:15:00	66.5	83.0	47.0
18/02/2016	23:30:20	00:15:00	62.4	79.0	43.0
18/02/2016	23:45:20	00:15:00	63.8	80.2	43.5
19/02/2016	00:00:20	00:15:00	63.2	81.4	41.1
19/02/2016	00:15:20	00:15:00	61.3	78.7	40.8
19/02/2016	00:30:20	00:15:00	61.2	78.6	40.6
19/02/2016	00:45:20	00:15:00	61.9	80.1	38.2
19/02/2016	01:00:20	00:15:00	58.5	76.9	37.7
19/02/2016	01:15:20	00:15:00	60.6	81.2	38.0
19/02/2016	01:30:20	00:15:00	61.4	81.8	39.6
19/02/2016	01:45:20	00:15:00	61.7	88.6	37.9
19/02/2016	02:00:20	00:15:00	56.9	74.8	40.0
19/02/2016	02:15:20	00:15:00	57.8	77.4	38.3
19/02/2016	02:30:20	00:15:00	56.3	76.9	37.3
19/02/2016	02:45:20	00:15:00	60.0	77.5	40.2
19/02/2016	03:00:20	00:15:00	57.4	78.5	38.5
19/02/2016	03:15:20	00:15:00	60.4	80.2	36.6
19/02/2016	03:30:20	00:15:00	59.1	78.4	38.3
19/02/2016	03:45:20	00:15:00	62.0	80.2	40.3
19/02/2016	04:00:20	00:15:00	61.3	79.4	37.3
19/02/2016	04:15:20	00:15:00	64.0	81.1	41.9
19/02/2016	04:30:20	00:15:00	64.6	80.9	45.0
19/02/2016	04:45:20	00:15:00	63.8	78.9	45.3
19/02/2016	05:00:20	00:15:00	67.3	80.6	49.3
19/02/2016	05:15:20	00:15:00	69.3	80.0	53.7
19/02/2016	05:30:20	00:15:00	70.8	80.6	55.4
19/02/2016	05:45:20	00:15:00	70.7	82.2	56.4
19/02/2016	06:00:20	00:15:00	71.8	81.2	57.7
19/02/2016	06:15:20	00:15:00	73.3	81.8	62.9
19/02/2016	06:30:20	00:15:00	74.6	90.2	66.1
19/02/2016	06:45:20	00:15:00	74.3	83.4	66.2
AVERAGE			67.2	-	44.9
HIGHEST			74.6	90.2	66.2
LOWEST			56.3	74.8	36.6

APPENDIX A3: VENTILATION SYSTEMS

The noise break-in calculations have been based on manufacturers' published test data for the ventilation units in the tables below:

Manufacturers' published sound insulation performance: Window frame vents

dB $D_{n,e,w}$	Ventilation unit
40	Titon SF3300 vent & 75mm spacer inside with SF Canopy & 50mm spacer-11mm outside / open
40	Passivent ALdB450 acoustic window vent inside with Fresh 65 outside
41	Titon SFSA acoustic V75 C50 / open
42	Passivent ALdB800 acoustic window vent inside with Fresh 65 outside
42	Renson Acoustic window ventilator Invisivent Evo AK Ultra / Open
42	Greenwood EAR42W Acoustic Window Ventilator
48	Renson Acoustic window ventilator Invisivent Evo AK EXTREME / Open

Manufacturers' published sound insulation performance: Through the wall vents

dB $D_{n,e,w}$	Ventilation unit
40	Rytons TAL9HMCWL - OPEN - ventilator assembly; x1 MFAB, TAL9x9 AirLiner1, HM123F Internal, ABC9 Cowl
42	Titon 9×6 Cowled Acoustic AirLiner® Set with Flush Louvre Ventilator
42	Rytons TALHMCWL - OPEN - ventilator assembly; x1 MFAB96, TAL8000 AirLiner, HM85F Internal, ABC6 Cowl
46	Greenwood AAB Acoustic Airbrick - Acoustic background ventilator
55	Greenwood MA3051 Acoustic wall ventilator
55	Titon Sonair F+ acoustic (attenuated) fitered air supply unit

Other ventilation units from other manufacturers are available. However, it should be noted that not all units advertised as having the $D_{ne,w}$ value(s) outlined as necessary in this report will provide the required attenuation at all frequencies. Ventilation units other than those listed above will need to be checked by an acoustic consultant. Selection should be based on $D_{ne,w}$ values achieved with vents in the OPEN position.

The specified ventilation sound insulation performance applies to the combined sound insulation of all vents in the room. If only one vent is required, it can be selected with the specified performance given. If more than one vent is required then the required performance for each individual vent must be increased by 10xlog(n) where n is the number of vents in the room. For instance, if there are 2 vents to a room for which a 42 dB $D_{ne,w}$ vent is specified, the required sound insulation performance for each individual vent must be increased to 45 dB $D_{ne,w}$.

Links to the above suppliers' websites are given below:

- http://www.greenwood.co.uk/range/15/acoustic-vents.html
- http://www.passivent.com/acoustic_vents.html
- http://www.titon.co.uk/pages/knowledge-support/acoustic-ventilation.php
- http://www.rensonuk.net/united-kingdom-acoustic-vent-sonovent.html
- http://rts.vents.co.uk/blog/index.php/approvals-testing/about-the-bre/#.VWzExM9VhBc