

Acoustic Report

Environmental Noise Survey Proposed Residential Development Upper Brow Road, Paddock, Huddersfield.

Our Reference – J2624

Survey Dates – 25th to 26th May 2017

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1.0 Agent

Jim Granger Design

The Studio

Coal Pit Lane

Brighouse

2.0 Subject

Proposed Development of 4 No Residential premises on land at 107, Upper Brow Road, Paddock, Huddersfield, HD1 4UP.

3.0 Aims

The aim of this report is to determine the existing baseline background noise environment levels, over a typical weekday period, affecting the proposed development location.

Provide an assessment of the results in accordance with the recommendations laid down in the National Planning Policy Framework, NPPF, for the proposed development site with respect to noise.

Provide mitigating noise control advice relating to the achievement of an acceptable internal environment for the development as recommended with World Health Organization's "Guidance for Community Noise, 1999".

4.0 Location and Description of Existing Noise Sources

The proposed development is located on land to the west of Manashay Cottage, No 107 Upper Brow Road, Paddock, Huddersfield.

There is a proposal to erect 4 No residential dwellings on the site. The site occupies an area approximately 80m x 25m and is rectangular in shape. The ground is flat at this location forming a plateau, with a rise in levels to the north beyond No 109 and 115 Upper Brow Road and falls away to the south.

The site is bounded to the north by the premises of No 109 and 115 Upper Brow Road. Upper Brow Road a no through road to motorized traffic, however, there is a pedestrian access at the far north of the road in the form of a foot path over the railway line, approximately 30m from the site boundary. Upper Brow Road follows a steep incline to the north approximately 30m above the site at the railway bridge with residential premises located on both sides of the road. The western site boundary is formed by a field and a cutting to a railway line beyond. The eastern site boundary is formed by the grounds of No 107 Manashay Cottage. The southern site boundary is formed by steep wooded ground down to a flowing stream in the valley below, with the A62 Manchester Road located on the up slope of the opposite valley rise. The train line, located approximately 30m north of the site runs in an east – west direction. This train line is located in a cutting approximately 6m deep as it passes directly past the site.

The primary noise sources within the vicinity of the site are predominantly due to distant traffic noise along the A62, Manchester Road and the nearby road network. Birdsong was a significant contributor to the noise climate in the area. Aircraft noise overhead were present periodically. Trains are audible but very low in volume as they pass the site due to the positioning of the track within a cutting. During daytime periods there is also very low industrial plant noise audible from the valley below. Water movement can be heard during the quieter nighttime periods.

5.0 Guidance on the Assessment of Noise Levels

The purpose of any criterion or standard for environmental noise should be to safeguard against unacceptable levels of community response, deemed as a feeling of annoyance during daytime or disturbance at night. WHO defines annoyance as “a feeling of displeasure evoked by noise”

The main source of information relating to noise and the community response are field studies including noise measurements and social surveys. These surveys attempt to establish a correlation between the two sets of results.

In the absence of any definitive guidance and in order to establish suitable noise criteria, it is necessary to rely on general guidance and assessment methods used for community noise sources. Discussions on the current methods are given below.

5.1 BS4142:2014 'Method for Rating and Assessing Industrial and Commercial Sound'

This recently revised standard provides a method for rating and assessing sound of an industrial and/or commercial nature. The method uses outdoor sound levels to assess the likely effect of sound on people who might be inside or outside a dwelling or premises used for residential purposes. It is limited to applicable sounds and is not intended for noise amounting to nuisance or rating noise outside the scope of the Standard.

Unlike the previous version of the Standard, rating levels are not prescriptive, but more context based, with the following applicable to rating values:

- Typically, the greater this difference (variance between impact of background and rating level), the greater the magnitude of impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context.
- A difference of around +5 dB is an indication of an adverse impact, depending upon the context.
- The lower the rating level is relative to the measured sound level, the less it is that the specific sound source will have an adverse impact or a significant impact. Where the rating does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon context.

The Standard introduces additional rating elements, these being subject assessments of tonality, and impulsivity of a sound source, with weighted rating values accordingly applied at the judgment of the assessor.

The introduction of Uncertainty has been applied to the measured values; again, consideration of this is left to the professional executing the survey and assessment. However, steps are provided within the Standard for the reduction of uncertainty in both measurement and calculations of the sound source and rating value.

Actual meteorological conditions are now required to be recorded and reported upon for the survey and report.

5.2 National Planning Policy Framework, NPPF.

The newly incumbent National Planning Policy Framework, NPPF, provides advice to planning authorities in England on how they must seek to minimise the adverse impact of noisy activities on noise sensitive receptors. This NPPF, replacing PPG 24, and is not prescriptive with respect to specific noise levels, and is mainly concerned with the advising on good practice for environmental noise assessment.

In the absence of definitive noise criterion within the NPPF most Local Authorities in England default to the daytime noise levels inside dwellings not to exceed NR 35; and NR 25, to be achieved inside dwellings at night to avoid sleep disturbance, based upon ingress of external noise sources.

5.3 World Health Organization 1999 "Guidance for Community Noise"

This document provides a review of the effects of noise and a description of the principles of the WHO health criteria and guidelines for Community Noise.

The effects of noise in dwellings are identified as sleep disturbance, annoyance and speech interference. For bedrooms, the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30 dB LAeq for continuous noise and 45 dB LAmax for sound events. At night time, outside sound levels about 1 metre from facades of living spaces should not exceed 45 dB LAeq, so that people may sleep with bedroom windows open. This value is equivalent to that specifies in the Criteria 12 document; however, it is now assumed that the noise reduction from outside to inside with the window open is 15 dB.

To enable casual conversation indoors during the daytime, the sound level of the interfering noise should not exceed 35 dB LAeq.

To protect the majority of people from being **seriously** annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB LAeq on balconies, terraces and in outdoor living areas. To protect the majority of people from being **moderately** annoyed during the daytime, the outdoor sound level should not exceed 50 dB LAeq.

Table 1 of the document summarises the guideline values for community noise in specific environments and includes the noise indices to be adopted. Significantly, the corresponding time base to be used for the assessment is also included.

The relevant extracts of Table 1 are reproduced thus:

Specific Environment	Critical health effect (s)	LAeq dB	Time Base hours	LAMax dB
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate Annoyance, Daytime and evening	50	16	-
Dwelling, Indoors	Speech intelligibility & moderate annoyance daytime & evening.	35	16	-
	Sleep Disturbance, night-time	30	8	45
Outside Bedroom	Sleep disturbance, window open (Outdoor Values)	45	8	60

5.4 Subjective Impression of Noise Changes

The following Table provides a semantic scale that may be used to “subjectively” rate changes in sound pressure level.

Table 1: Subjective effect of changes in sound pressure level

Change in sound level dB	Change in Power		Change in apparent loudness
	Decrease	Increase	
3	1/2	2	Just perceptible
5	1/3	3	Clearly noticeable
10	1/10	10	Half / Twice as loud
20	1/100	100	Much quieter / louder

After Bies and Hansen

This table is taken from Professor Colin H Hansen’s publication “Fundamentals of Acoustics” page 41, for the Department of Mechanical Engineering, University of Adelaide.

This table also appears in “Engineering Noise Control” by Colin Hansen and David Bies, a comprehensive reference book, amongst others.

6.0 Survey Equipment

Integrating Sound Level Meter, RION NA-27, Type 1, Serial No 431986

RION UC-53A Microphone Serial No 35771

RION NC-74 Calibrator Serial No 530712

Windshield, Tripod

7.0 Survey Method

An attended pre-development environmental noise assessment survey was carried out encompassing daytime, evening and nighttime periods between 25th and 26th May 2017 by the author.

LA_{eq} , LA_{90} , LA_{10} , and LA_{max} sound measurements were taken using the sound analyser.

The measurement indices noted above are defined as follows:

$LA_{eq, T}$	the “A” weighted equivalent continuous noise level of sample period T
$LA_{10, T}$	the “A” weighted level exceeded for 10% of sample period T
$LA_{90, T}$	the “A” weighted level exceeded for 90% of sample period T
LA_{max}	The “A” weighted maximum level during the sample period T

Various sound measurements were taken using the sound analyser. The meter was calibrated before and after the measurements using the calibrator to ensure accuracy of the results. No fluctuations were noted between calibrations and the results obtained can be deemed to be an accurate representation of the levels recorded.

In order to ascertain the existing typical background noise climate, sound recordings were taken at over 1 hour and 15 minute sample periods during daytime and evening / nighttime respectively.

The meter was mounted on the tripod at a height of 1.5m above ground and at least 3m from any reflective plain. Refer to Appendix A for a marked up locational sketch for the survey points.

8.0 Prevailing Weather Conditions

25th May 2017 - Daytime – 25°C, 10% cloud cover, wind E 0-1m/s, 59% rh, 1023 mb

25th May 2017 – Evening - 20°C, 40% cloud cover, wind SE 0-1m/s, 65% rh, 1022 mb

25th – 26th May 2017 - Nighttime – 17°C, 60% cloud cover, wind SSE 0-1m/s, 75% rh, 1021 mb

All road surfaces were dry throughout the monitoring period.

9.0 Pre-Development Noise Survey Results

During the monitoring period separate noise samples were recorded, using a 1/1 Octave Centre Band analysis. These monitoring samples were collected from the northern site boundary, generally, at the same location for daytime, evening and nighttime periods. This was to establish the general noise levels experienced externally by the site at the most exposed position available and therefore likely to experience the worst case noise climate.

The table of results on the following page indicates the noise levels recorded for the site location selected during the monitoring period, with a brief description of the noise sources contributing to the individually monitored noise levels recorded.

The above monitoring locations should be read in conjunction with the site layout appearing in Appendix A of this report.

Refer to Appendix B for the survey results frequency analysis table.

10.0 Noise Survey Results Table

UPPER BROW ROAD, PADDOCK - NOISE SURVEY RESULTS TABLE

Survey Location	Data ID	L _{Amax} dB	L _{Aeq} dB	L _{A10} dB	L _{A90} dB	Survey Duration	Survey Date	Start Time	Source Description
1	1	52.7	43.5	45.0	41.2	01:00:00.00	25-05-2017	09:31:22	Distant traffic audible. Birdsong. Aircraft. Passing train. Industrial plant audible but low.
1	2	64.3	48.0	51.0	42.8	01:00:00.00	25-05-2017	10:31:22	
1	3	59.6	50.2	51.8	48.2	01:00:00.00	25-05-2017	11:31:22	
1	4	63.5	49.4	50.2	45.9	01:00:00.00	25-05-2017	12:31:22	
1	5	50.9	46.5	48.4	44.4	01:00:00.00	25-05-2017	13:31:22	
1	6	57.1	48.0	49.4	46.2	00:15:00.00	25-05-2017	20:01:06	Distant traffic audible. Birdsong.
1	7	58.6	48.3	50.4	44.5	00:15:00.00	25-05-2017	21:06:11	
1	8	55.1	47.5	50.4	43.1	00:15:00.00	25-05-2017	22:38:19	
1	9	48.1	32.7	34.4	29.1	00:15:00.00	26-05-2017	00:20:37	Distant traffic dominant. Low water flow audible.
1	10	54.1	40.3	42.0	29.2	00:15:00.00	26-05-2017	01:47:10	Distant traffic dominant. Low water flow audible. 1 No passing train.
1	11	52.1	42.8	47.1	33.5	00:15:00.00	26-05-2017	01:30:08	Distant traffic dominant. Low water flow audible. 1 No passing train.
1	12	48.1	40.1	44.2	33.9	00:15:00.00	26-05-2017	02:41:14	Distant traffic dominant. Low water flow audible.
1	13	48.5	41.1	44.9	33.2	00:15:00.00	26-05-2017	03:00:22	Distant traffic dominant. Low water flow audible.

11.0 Results Analysis

The above noise survey, carried out between 25th and 26th May 2017, was chosen as a representative weekday period to reflect the typical noise climate for the area surrounding the proposed development site.

The noise survey results obtained for the site can, therefore, be deemed to be representative of normal activities for the area and will be used as the base for analysis and assessment purposes below.

Assessments of the individual results indicate that the monitoring position selected is affected primarily by traffic noise sources from the movements along the the A62, Manchester Road, the local road network, with birdsong significant during daytime periods and train passages audible periodically at all times.

From the data acquired during the various assessment periods the following exposure noise levels have been established for the site.

Table of Exposure Levels

Period	Noise Level
Daytime (0700 – 2300 Hrs)	LAeq, 16 Hours – 49 dB
Night-time (2300 – 0700 Hrs)	LAeq, 8 Hours – 42 dB LAFmax - 54 dB

12.0 Mitigating Circumstances

The proposal for the development site is for the erection of 4 No detached premises. These premises will be accessed from Upper Brow Road to the east, as indicated on drawing No 2-Site Plan. See Appendix A-2 for details. The premises will be 2 storey dwellings.

There are 3 main areas to consider within the development to ensure that the building provides adequate attenuation against the ingress of external noise sources that are likely to affect the comfort and amenity of the residents.

- Building Fabric Construction
- Glazing Units
- External Recreational Areas

12.1 Building Fabric Construction

The Building Regulation, relating to the minimum acoustic requirements for the various areas of the development, must be met.

Actual verification of the acoustic properties of the buildings fabric will need to be executed by pre-completion sound testing prior to occupation, or through certified test data with a Robust Details construction method.

Based upon the external baseline noise levels recorded, primarily due to traffic noise, the minimum weighted sound reduction, R_w , of the external façades will need to be R_w 45 dB to ensure that an internal specification of 30 $L_{Aeq, 8hours}$ dB maximum, (equivalent to NR 25), is met within the noise sensitive dwelling areas during nighttime periods, as determined within the WHO recommendations. The LAFmax of 54 dB will be attenuated such that the internal level will be up to a maximum value of 9 LAFmax dB, again in line with the specific requirements of WHO.

Given a typical modern wall construction comprising an internal leaf of concrete block, lined externally with brick/stone and a cavity between of at least 75mm, the following performance would be expected from the external façade construction:

Frequency in Hz	125	250	500	1000	2000
R_w of Facade	41	45	45	54	58

The roof of the buildings should provide the necessary sound insulation to meet the Building Regulations with respect to the passage of sound. It is recommended that the ceiling of the upper floor below the loft space is lined with 2 No layers of 12.5mm sound block plasterboard to minimize noise transmission possibilities into the bedroom areas below.

12.2 Glazing Units

The primary weakness in any building envelope is usually due to windows, ventilation louvres and other apertures.

The development will not have air conditioning installed within the noise sensitive residential areas of this development, other than extraction from bathrooms which are not within the noise sensitive bedroom areas and therefore the only area of concern are the proposed window systems.

In order to provide adequate attenuation against the sound levels in the area and achieve the Building Regulations and WHO criteria, it is recommended that the formed apertures are fitted with suitable acoustic glazing units.

Using the sound exposure levels assessed for the site the minimum recommended Rw dB rating for the glazing systems for the site should be as follows.

Period	Noise Exposure Level	Internal Living Space / Bedroom Target Level	Minimum Rw Values Required
Daytime (0700 – 2300 Hrs)	LAeq, 16 Hours – 49 dB	LAeq, 16 Hours – 35 dB	Rw 14 dB
Night-time (2300 – 0700 Hrs)	LAeq, 8 Hours – 42 dB LAmax - 54 dB	LAeq, 8 Hours – 30 dB LAmax - 45 dB	Rw 12 dB Rw 9 dB

Based upon generic data for glazing systems, it is possible to provide the necessary sound insulation using a glazing system consisting of a 4mm Glass – 20mm wide Argon Filled Airspace – 4mm Glass. This system has certified acoustic values of Rw 30 dB, with an RA 30 dB and RA,tr 27 dB.

This is the recommendation for all elevations of the development.

The acoustic properties of this type of glazing is provided below for reference.

Glazing type	Frequency in Hz	125	250	500	1000	2000
4/20/4	R _w of Facade	24	20	25	34	37

If we consider an opening a window within a bedroom to provide additional room ventilation, the accepted attenuation value of the open window is -15 dB, this would allow for an internal noise level within a bedroom of up to 27 LAeq dB. This level of ingress is deemed as not likely to result in sleep disturbance due to external sources, set at a limit of 30 LAeq dB within WHO.

Since the limit of acceptability has been shown to be reached and as such additional means of ventilation are not strictly necessary for this specific development, however, and in order to ensure disturbance due to external noise sources is not experienced due to extraneous events not picked up in the survey, and still provide adequate ventilation within dwelling areas, an alternative to opening a window would be to consider installation of an acoustic trickle ventilation system.

The trickle ventilation system that provides both adequate background ventilation in accordance with Approved Document F1 and the minimum acoustic properties to maintain the internal noise characteristics of a closed window using a through ventilator. The R_w values quoted above do not include for the trickle vent combination within their values and as such inclusion of a standard trickle vent will diminish the R_w values quoted.

The combined acoustic properties of the acoustic trickle vent system proposed for use on this site, Greenwood 2500EA achieve a specified sound reduction of 46 D_{n,e,w} dB through the ventilator in the open position, assuming it is fitted through a 300mm thick wall. This level of attenuation is achieving the minimum requirements necessary to ensure that the internal noise levels inside the bedrooms are maintained for all elevations of this project. Other manufacturers could be considered provided that the D_{n,e,w} dB value is maintained.

An alternative to a trickle vent system would be the use of a forced ventilation system, either attending to the dwelling spaces only or a "Whole House" system that would remove the need for opening windows during nighttime periods. This type of system is usually located within the roof space of the dwelling and as such not likely to give rise to noise issues from its own operation, when considered either for the internal residents or the external amenity of the the nearby noise sensitive residential premises. An

acceptable system would be the Seigenia-Aubi EUROPAC which is a forced vent specifically designed for this purpose.

Another alternative to passive “background” ventilation or whole house ventilation would be rapid ventilation via wall mounted acoustic extract fans positioned within the individual bedrooms and living spaces of the dwellings. The fan assembly should provide at least a 43 dBA acoustic performance level difference when not in operation. This type of extraction allows for the windows of the property to remain closed whilst still providing adequate forced ventilation during the summer periods on an individual selective basis. These acoustic ventilation systems are available from various suppliers, an example being the Greenwood Airvac AAF/S Acoustic Extract Ventilator unit, providing manual control of the fan operation.

The forced ventilation system, either individual or whole house systems are the recommended method provided within Kirklees Council’s “Noise Design Advise” guidelines for new build residential premises section 2.1 paragraph 4 dated May 2007.

12.3 External Recreational Areas

The development is to include external recreational areas to the southern side of the dwellings in all cases and as such these areas would be subject to the recorded noise climate for the site based upon daytime values. The recorded external levels ranged up to 50.2 LAeq dB during daytime periods, with an average slightly lower of 49 LAeq dB applicable to the site due primarily to external traffic sources from the A62 on the opposite side of the valley. Whilst train passage noise was audible at the site it was not the dominant source during daytime periods.

A noise level of this magnitude is below the recommended noise criteria for outdoor spaces and as such no additional mitigation would be required to achieve the limits of 50 LAeq dB for external spaces as indicated within WHO in section 5 above.

13.0 Report Summary

An attended pre-development acoustic assessment of the existing noise levels around the proposed development of land to the west of Manashay Cottage, No 107, Upper Brow Road, Paddock, Huddersfield has been undertaken with respect to noise.

The noise survey established the pre-existing noise climate and sources for the area; which are primarily due to traffic movements along the A62, Manchester Road on the opposite side of the valley. Birdsong is also a significant contributor to the noise climate. Train noise which audible when present was not the significant contributor to the background noise climate due to its proximity within an earth cutting as it passed the site to the north.

In order to achieve an acceptable and comfortable internal noise climate for the potential students the WHO guidance community noise has been utilized for the acoustic target levels for the internal criteria of the dwelling areas of the development. The National Planning Policy Framework has been considered, with NR 35 daytime and NR 25 nighttime internal limits being utilized since the NPPF is not prescriptive in its noise limits.

Mandatory mitigating recommendations are necessary to provide adequate protection against intrusion from external noise sources and achieve the WHO guidelines for the internal noise climate of the residences.

Recommendations have been proposed for the glazing systems to be employed on this development, in order to achieve the internal dwelling room design target exposure levels as determined within WHO recommendations.

To provide background ventilation opening a window would be acceptable in this case, however, additional recommendations have been provided for options of either acoustic passive or forced ventilation to be used on the development throughout.

The development has proposal for external recreational areas, however, due to the low background noise climate during daytime periods no additional mitigation measures are necessary to preserve the amenity of the incumbent residents.

Appendix A-1 Locational Outline and Monitoring Position



Appendix A-2

Proposal Outline Drawing No 2-Site Plan



Appendix B Noise Survey Frequency Analysis Results Table

UPPER BROW ROAD, PADDOCK - NOISE SURVEY FREQUENCY RESULTS TABLE

Map Location	Data ID	L _{Amax} dB	L _{Aeq} dB	Linear Leq dB Sound Pressure Levels								L _{A10} dB	L _{A90} dB
				63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz		
1	1	52.7	43.5	52.8	49.0	42.8	40.9	39.6	30.9	31.4	25.1	45.0	41.2
1	2	64.3	48.0	53.3	51.0	45.7	43.3	43.8	38.9	38.4	31.8	51.0	42.8
1	3	59.6	50.2	56.9	54.6	49.2	46.3	47.1	38.9	34.4	30.1	51.8	48.2
1	4	63.5	49.4	54.8	50.2	47.2	45.1	45.6	41.0	37.4	34.8	50.2	45.9
1	5	50.9	46.5	53.4	47.1	43.9	42.8	43.5	36.8	32.8	27.2	48.4	44.4
1	6	57.1	48.0	49.8	47.4	46.5	43.5	44.5	40.5	32.7	21.6	49.4	46.2
1	7	58.6	48.3	51.4	49.7	47.0	43.4	44.7	40.9	34.7	23.2	50.4	44.5
1	8	55.1	47.5	49.7	43.2	42.1	40.5	43.4	41.8	36.1	27.0	50.4	43.1
1	9	48.1	32.7	40.6	37.4	32.1	29.2	28.6	23.9	16.8	14.1	34.4	29.1
1	10	54.1	40.3	55.9	39.3	35.2	35.8	37.8	31.4	23.9	19.0	42.0	29.2
1	11	52.1	42.8	38.9	35.2	37.0	39.3	41.2	30.0	19.1	14.9	47.1	33.5
1	12	48.1	40.1	37.8	33.5	35.1	34.4	38.7	29.2	18.0	15.7	44.2	33.9
1	13	48.5	41.1	43.3	37.2	36.1	38.1	39.1	28.8	16.4	14.1	44.9	33.2