Approved by: Matthew Gibson
Date: 17.08.17

Noise Assessment Report
Ref: AA0007

Noise assessment of potential additional traffic noise from house development.

Mr David Garratt
20 Sunlaws Street,
Glossop,
SK13 8EQ

Azymuth Acoustics UK
Viridor House
No.3 Bolholt Terrace
Bury/Gtr Manchester
BL8 1PP
Tel: +44 (0)161-762 1055
Fax: +44 (0)161-761 1094
E-mail: mail@acousticsuk.com
Web: www.azymuthacousticsuk.com

Document Status - Final

Reference: AA0007			**Date:**
Produced by:		Dominic McCann	17 August 2017
Checked by:		Matthew Holland	17 August 2017
Approved by:		Matthew Gibson	17 August 2017

Disclaimer

This report has been prepared by Azymuth Acoustics UK with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our Standard Terms and Conditions of Business and taking into account the resources devoted to it by agreement with the Client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own discretion and risk.

Contents

1.0 Introduction

Azymuth Acoustics UK was appointed by Mr David Garratt of 20 Sunlaws St to provide an environmental noise assessment in order to apply for prior determination of planning for a proposed dwelling. It is understood that the main concerns centre on connection with any likely impact on residential use from any generated road traffic from the proposed development.

The noise assessment includes:

● The results of a baseline survey in the vicinity of the premises

● Assessment of the noise levels against guidance in order to protect future and existing residents against environmental noise.

2.0 Baseline Noise Survey

2.1 Measurement Procedures

The instrumentation used for the environmental noise survey consisted of a SvanTek 959 type 1 precision sound level meter. The equipment was calibrated before and after the noise measurements. The sound level meter measured at A-weighted (fast response) noise levels as well as octave bands noise levels for all measurement record.

The ambient noise level survey was undertaken between 13:38 to 16:55hrs during the afternoon of 13th July 2017 and 21:30 to 23:30hrs during the evening of 15th August 2017. The survey covered a baseline noise assessment over the minimum required hours.

The ambient noise measurements were undertaken by Dominic McCann using the sound level meter microphone at the locations shown in figure 1 below

Figure 1: Measurement Locations marked in red on aerial photograph

2.2 Results of Noise Measurements

The results of the noise measurements are summarised below and the full results are set out in Appendix B.

The following table summarises the results of the noise measurements undertaken at the proposed site in terms of averaged Day/Night statistical noise levels.

	Time period	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
1)@2m from edge of pavement	Daytime (13:38 – 16:55)	74.0	55.5	55.8	46.5	43.3
2) Nearest residential receptor @1m window		68.2	51.0	54.1	45.0	41.0
3) Garden @7m from proposed dwelling		69.2	50.7	52.3	47.6	45.3
1)@2m from edge of pavement	Evening time (21:05 – 23:15)	69.2	50.3	49.1	41.5	38.1
2) Nearest residential receptor @1m window		64.3	47.3	46.8	36.9	33.3
2) 1 car @2m from proposed drive-way	30 seconds (4 no. measurements)	64.9	54.2	58.1	49.4	46.0

Table 1: Results of Baseline survey (including 30 second car intervals)

2.3 Description of Noise Climate

The day-time noise climate in the area is predominately quiet, with the occasional road traffic on Sunlaws St. Noise from public passer-by also made a contribution to the measured levels. In addition, sound from a nearby school was clear throughout the survey. The night-time survey consisted of very little noise impact, except for the occasional airplane and nearby traffic.

3.0 Noise Assessment Criteria

In order to assess the extent of any measures which might be necessary in order to comply with suitable conditions relating to traffic noise break-in, Azymuth Acoustics has reviewed the following guidance documents and standards:

- BS 8233: 2014
- World Health Organisation Guidelines on Community Noise
- National Planning Policy Framework (NPPF) 2012
- Design Manual for Roads and Bridges 2008

3.1 BS 8233: 2014

BS 8233 provides a code of practice for the sound insulation of a variety of building types affected by general environmental noise. It provides recommendations for control of noise in and around buildings and suggests appropriate internal ambient noise level criteria / limits for a variety of different situations including residential properties.

The following table summarises the noise limits suggested by BS 8233 applying to residential properties:

Activity	Room	Good Design Range $L_{Aeq,T}$ dB	
		07:00-23:00hrs	23:00-07:00hrs
Resting	Living rooms	35	-
Dining	Dining room / area	40	-
Sleeping (daytime resting)	Bedroom (at night)	35	30

Table 2: Noise Limits for Residential Properties Suggested in BS 8233

3.2 W.H.O Guidelines on Community Noise

In 1980 the World Health Organisation proposed environmental health criteria for community noise including consideration of noise levels at which sleep disturbance may take place. These guidelines were amended by the World Health Organisation in 1999. The guidance suggests that an internal L_{Aeq} below 30dB is required to preserve the restorative process of sleep. This is equivalent to a free-field level of around 42 to 45dB L_{Aeq} or a façade level of 45 to 48dB L_{Aeq}, assuming open windows.

To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and out living areas should not exceed 55 dB L_{Aeq} for a steady, contentious noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq}. These values are based on annoyance studies, but most countries in have adopted 40 dB L_{Aeq} as the maximum allowable level for new developments (Gottlob 1995) indeed, the lower value should be considered the maximum allowable sound pressure for all new developments whenever feasible.

At night, sound pressure levels at the outside façade of the living space should not exceeded 45dB L_{Aeq} and 60dB $L_{Amax,}$ so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15dB.

3.3 National Planning Policy Framework (NPPF) 2012

The NPPF provides guidance to local authorities taking into account noise in making planning decisions. Paragraph 123 of the National Planning Policy Framework (NPPF) states that planning polices and decisions should aim to:

- Avoid noise 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

The National Planning Policy Framework states that the planning system should 'prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability'.

3.4 Design Manual for Roads and Bridges

This document (DMRB) provides guidance on the assessment of the impacts that road projects may have on levels of noise and vibration. The document identifies that a change in road traffic noise of 1 dB $L_{A10,18h}$ in the short term (e.g. when a project is opened) is the smallest that is considered perceptible. The classification of magnitude of impacts to be used for traffic noise is given in Table 3.1 (short term) and Table 3.2 (long term).

Short Term Noise Change $L_{A10, 18hr}$	Magnitude of Impact
0	No change
0.1 - 0.9	Negligible
1 - 2.9	Minor
3 - 4.9	Moderate
5+	Major

Long Term Noise Change $L_{A10, 18hr}$	Magnitude of Impact
0	No change
0.1 - 2.9	Negligible
3 - 4.9	Minor
5 - 9.9	Moderate
10+	Major

Tables 3.1 and 3.2 from DMRB: Classification of magnitude of noise impacts from road traffic in short and long term (15yrs from development)

3.5 Summary of Noise Assessment Criteria

Based on the guidance outlined above, Azymuth Acoustics has carried out a noise assessment with the primary aim of providing satisfactory condition in and outside the residential property. The recommended criteria can summarised in conjunction:

- A classification of magnitude of noise impacts from road traffic $L_{Aeq, 18hr;}$ it is proposed that a similar approach to that of DMRB shall be used with L_{Aeq} substituted for L_{A10}.
- The daytime outdoor sound pressure level should not exceed 55 dB L_{Aeq} (on drive-way).
- Noise level changes of less than 1dB will be deemed acceptable.

4.0 Assessment of Noise Levels

4.1 Assessment of 18hr Noise Levels

Measured noise levels on Sunlaws Street are in the range of 50 – 56 dB $L_{Aeq60\ mins}$ for daytime periods and 40 – 53 $L_{Aeq\ 60mins}$ for evening periods. As a matter of principal, Azymuth Acoustics incorporated the shortened calculation of road traffic (as set out in CRTN); the measurement requires 1dB of subtraction from a 3 hour $L_{Aeq\ 18hr}$ consecutive measurement (as shown in table 4, position 3). However, this has been corrected in order to take account of the evening noise levels where appropriate.

The following table provides an assessment of calculated additional traffic noise from **8** cars (using the 30 sec event level 54.2 dBA from table 1 above) covering an 18 hour (day/night combined) period at each position. Azymuth Acoustics incorporated the short term noise change (table 3.1) assessment of the potential impact in order to give a fair representation of the 18 hr period, on the basis of a 30 second car measurement.

Position	L_{Aeq} No Additional cars 18hrs	L_{Aeq} Plus 8 Cars Over 18hrs	Difference	Magnitude of impact
1)@2m from edge of pavement	53.6	53.6	0.02dB	No change
2) Nearest residential receptor @1m window	49.6	49.6	0.05dB	No change
3) Garden @7m from proposed drive-way	49.7	49.7	0.05dB	No Change

Table 4: Classification of noise impacts from 8 cars in short term noise change.

4.2 Assessment of Noise Levels over a 1hr period

Although the normal assessment procedure would be to assess the noise levels over an 18hr daytime period or 6hr night-time Azymuth Acoustics UK have also carried out a similar assessment with 4 car movements over a 1hr period in order to identify the worst possible reasonable case.

Position	L_{Aeq} No Additional cars 1hr	L_{Aeq} Plus 4 Cars Over 1hr	Difference	Magnitude of impact
1)@2m from edge of pavement	53.6	53.8	0.17dB	Negligible
2) Nearest residential receptor @1m window	49.6	50.0	0.41dB	Negligible
3) Garden @7m from proposed drive-way	49.7	50.1	0.40dB	Negligible

Table 5: Classification of noise impacts from 4 cars in short term noise change (1hr period).

5.0 Conclusion

Azymuth Acoustics has undertaken an acoustic assessment of potential noise impact from the existing drive-way of a proposed dwelling, particularly the nearest residential receptor @1m from the window. Noise levels from 07:00-23:00 hrs in the vicinity of the nearest residential receptor are typically in the range of 50 - 51dB L_{Aeq}.

Noise from traffic and the occasional passer-by made the most contribution to the noise climate, as well as activity at the nearby school during the daytime. Similarly, traffic noise was also present throughout the evening periods.

The noise assessment indicated that the worst case noise produced by 8 car movements on the drive-way would result in a maximum of 0.05 dB increase in the $L_{Aeq,\ 18hrs}$ noise level at the nearest receptor. Even extending this assessment to cover 4 car movements over a 1hr period would results in a maximum of 0.41 dB increase in the $L_{Aeq,\ 18hrs}$ noise level. As a result it is deemed that using the guidance reviewed in this assessment would indicate that the effect on the local noise levels would be negligible or less.

Nevertheless the client has indicated that a solid timber fence along the driveway and/or new smooth driveway surface material would be provided in order to help to mitigate what sound might be audible from the occasional vehicle movements.

Appendix A – Glossary of Terms

Decibel (dB)
This is the unit used to measure sound. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro Pascal to 100 Pascal).

dB(A)
This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. A-weighting) to compensate for the sensitivity of the human ear to sound of different frequencies. The A-weighting curve is implemented in sound level meters using an electronic filter that approximately corresponds to the frequency response of the ear.

Octave Band Noise Level
The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz. The ear is also generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum can be divided into frequency bands. The most commonly used frequency bands are octave bands, in which the mid-frequency of each band is twice that of the band below it.

L_{Aeq}
This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over a given time period.

Reverberation Time (RT or sometimes T_{30} or T_{60})
This is the time taken for the reverberant sound energy in an enclosure to decay one millionth of its equilibrium value, i.e. by 60 dB, after the source has been switched off, is known as the reverberation time. The reverberation time is frequency dependent and it is customary to measure its value in octave or one-third octave bands. Reverberation occurs when sound waves are repeatedly reflected from each surface of the room.

Sound Reduction Index (SRI)
Difference measured between the amount of energy flowing towards the wall in the source room and the total amount of energy flowing towards the wall in the source room and the total amount of energy entering the receiving room (usual range 100 - 3150 Hz for one third octave band values). The SRI varies with frequency and is measured in a laboratory in either octave or one-third octave bands.

SRI = L1 - L2 + 10 log (S/A)

Where: L1 = Noise level in the source room
L2 = Noise levels in the receiving room
S = Surface area of test specimen
A = Equivalent acoustic absorption area in the receiving room

Weighted Sound Reduction Index (R_w)
This is a weighted single figure descriptor of the sound insulation performance of a partition measured under laboratory conditions. The procedure used to quantify the R_w is to compare the sound reduction index (SRI) in each of the one-third octave bands from 100Hz to 3150Hz against a set of standard reference curves.

Appendix B – Full tabulation of results

Start	Position	Time	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
13th July 2017							
13:38'14	1	00:10'00	72.3	55.8	46.3	42.3	72.3
13:48'14	1	00:10'00	73	53.9	46.1	43.1	73
13:59'20	1	00:10'00	72.8	56.4	47.8	44.5	72.8
14:09'20	1	00:10'00	75.2	57	46.3	42.4	75.2
14:20'24	1	00:10'00	71.7	53.7	46.3	44	71.7
14:30'24	1	00:10'00	78.9	55.5	45.9	43.6	78.9
15:00'36	2	00:10'00	66.1	50.4	45.3	42.6	66.1
15:15'54	2	00:10'00	68.7	50.1	45.5	41.5	68.7
15:25'54	2	00:10'00	73.5	53.2	46.2	41.1	73.5
15:40'54	2	00:10'00	63.8	49.4	44.8	41	63.8
15:50'54	2	00:10'00	67.8	49.7	41.7	38.9	67.8
16:01'50	2	00:10'00	69.4	51.1	46.2	41	69.4
16:21'38	3	00:10'00	69.6	50.5	47.6	45	69.6
16:35'08	3	00:10'00	74.2	51.7	47.8	45.5	74.2
16:45'08	3	00:10'00	63.9	49.8	47.3	45.4	63.9
15th August 2017							
21:05'00	1	00:10'00	70	51.2	48.3	42.9	40.4
21:15'00	1	00:10'00	70	50.3	51	43	40
21:25'28	1	00:10'00	66	45	45	41.1	38.4
21:41'58	1	00:10'00	67.6	49.3	50	41.5	38
21:55'26	1	00:10'00	69.5	48.1	43.7	39.5	35.7
22:05'46	1	00:10'00	72.2	53.6	56.8	41	36.3
22:24'16	2	00:10'00	68.2	49.6	53	38.8	34.6
22:34'16	2	00:10'00	64	47.9	49.8	37.7	34.4
22:45'58	2	00:10'00	61.7	40.1	39.7	36.2	32.4
22:55'58	2	00:10'00	65.1	47.6	46.4	36.5	33.1
23:05'58	2	00:10'00	61.1	44.3	47	36.5	33.3
23:15'58	2	00:10'00	65.7	48.6	45	35.4	32.2