BRAIDEN ACOUSTICS LTD

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RESIDENTIAL ACOUSTIC SURVEY

Client : Sherwood Homes Ltd

Date : 16 Sep 2016

Site : Charlestown Works, Glossop

Report No. : 10472revA

1 INTRODUCTION

Braiden Acoustics has been commissioned by Sherwood Homes Ltd to undertake an acoustic survey at the site of the Charlestown Works, Glossop in order to discharge a noise condition for planning application HPK/2013/0597 which proposes:

> *Proposed demolition of existing structures & erection of up to 100 dwellings including 14 in the conversion of the former office building 1660m2 of B1 commercial floor space and including restoration of former mill pond and to create public open space at Charlestown Works Charlestown.*

The noise condition reads as follows:

> *19. a) The specification of the acoustic barrier and its location shall be the subject to a scheme submitted to and approved by the local planning authority as part of the reserved matters application. Such a scheme shall show the detailed position, size and attenuation provided to the garden areas of the development and shall be supported by appropriate calculation showing the range of attenuation across individual garden areas to ensure the specified noise criteria in these areas are met and maintained.*
>
> *b) Before occupation of any of the development screened by the said acoustic fence, validation testing shall be carried out to ensure the range of attenuation approved has been achieved and as such shall be discharged before any of the said dwellings are occupied.*

Although the noise condition focussed on the details of the barrier shielding noise in the gardens, it was felt that a new survey was required, not least, due to the time elapsed since the original report dated January 2013.

1.1 AIM

The following report shall use some of the original noise.co.uk report and data where still applicable and amend, expand and update where appropriate, in order to discharge Condition 19 of planning application HPK/2013/0597.

2 DESCRIPTION OF SITE

The former Charlestown Works is a large sprawling site either side of Charlestown Road in the village of Charlestown only few kilometres south of Glossop. The site was last used by Kingspan Insulation in 2006 and has been derelict ever since.

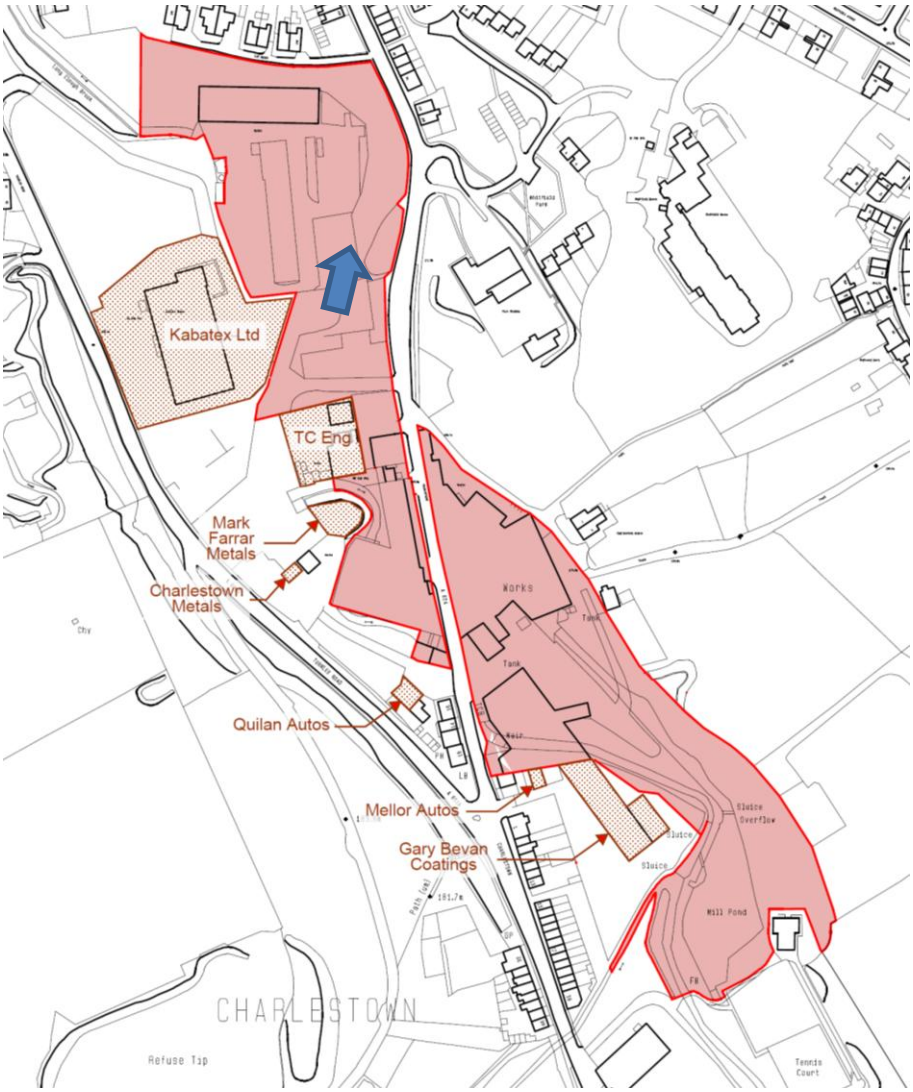

Figure 1
Existing site layout

The watercourse known as Long Clough Brook runs through both parts of the site; however it is largely hidden by industrial development and there are culverts in a number of sections including where it crosses Charlestown Road.

2.1 SITE LOCATION AND SURROUNDING USES

The site has a mixture of residential, current small industrial units and green spaces surrounding it. There are existing residential dwellings both to the north and south of the site and some small industrial uses along the length of the site on both sides of Charlestown Road.

Table 1 summarises the existing industrial uses.

Company	Use	Typical Activities	Hours of Operation	Included in original noise survey	Change in use since original noise survey
Kabatex Ltd	Furniture Distribution Centre	Large lorry movments; fork lift truck movenments; fork lift truck reverse sirens		Yes	No
TC Engineering	Fabrication / Engineering	Welding; fork lift truck; compressor; impact noise etc.	Mon – Fri o 08:00 – 17:00	Yes	No
Mark Farrar Metals	Metal Recycling	Mechanical diesel digger	Mon – Fri o 09:00 – 17:00	No	No
Charlestown Metals	Fabrication / Welders	Vehicle movements; drilling, sawing, hammering and chop saw	Mon – Fri 09:00 – 17:00	Yes	No
Quinlan Autos	Car Mechanic	Ramp; hammering and other impact noise; grinders	Mon – Fri 08:30 – 19:00 Saturday 08:30 – 15:00	Yes	No
Mellor Autos	Car Mechanic	Not is use during either survey but assumed typical car mechica noise[1]	Mon – Fri 09:00 – 18:00 Saturday 10:00 – 13:00	Yes	No
Garie Bevan Coatings	Powder coating	fork lift truck; fixed plant noise (a/c)	08:00 – 02:30	Yes	No

Table 1
Summary of local industrial uses

2.1.1 Topography of site

The north west section of the site is at least 10m below Charlestown Road. The photo below was taken at the location and direction of the blue arrow in Figure 1. The retaining wall leading up to the Charlestown Road can clearly be seen.

Figure 2
Photo from the entrance of the existing Stone Works on the north west of the site looking towards Charlestown Road.

[1] Not in use for either the Braiden Acoustics or noise.co.uk surveys

Other areas of the site are relatively level with the road.

2.2 EXISTING USE

Charlestown Works is an established complex of mill and factory buildings that has been derelict for 10 years.

2.3 PROPOSED USE

The proposed site layout in shown in Appendix A1.

The overall scheme is as follows:

- 85 houses
- 11 flats (not 12 or 14 as mentioned elsewhere)
- office units.

KEY

HOUSETYPE SCHEDULE

TYPE	BED ACCOMODATION / DWELLING TYPE	STOREY HEIGHT	SIZE (SQ FT)	No OF UNITS
CWG1	3 BEDROOM SEMI / 3 TERRACED HOUSE	3	1286	24
CWG2	3 BEDROOM SEMI / 3 TERRACED HOUSE	3	1259	10
CWG3	3 BEDROOM DETACHED HOUSE	2	948	2
CWG4	2 BEDROOM SEMI DETACHED HOUSE	2	857	5
CWG5	3 BEDROOM SEMI DETACHED HOUSE	2	857	2
CWG6	3 BEDROOM SEMI DETACHED HOUSE	2	919	2
CWG7	3 BEDROOM SEMI / 3 TERRACED HOUSE	2.5	919	26
CWG8	3 BEDROOM SEMI / 3 TERRACED HOUSE	3	1075	9
TOTAL NO. OF DWELLINGS				85

Table 2
Acoustic criteria and methodology

3 ASSESSMENT CRITERIA AND STANDARDS

This is a residential development that may be susceptible to environmental noise. Potential mitigation measures are determined by recommended indoor noise levels from BS 8233 "Sound insulation and noise reduction for buildings" [1] which, in turn, takes guidance from the research based World Health Organisation "Guidelines for Community Noise".

Noise level thresholds are usually given for the night-time – 2300-0700 hrs and day time – 0700-2300 hrs.

3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework is the current document for planning guidance. Paragraph 123 of the NPPF says that planning decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and

- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.2 BS 8233: 2014

The British Standard BS 8233:2014 "Guidance on sound insulation and noise reduction for buildings" gives guidance on recommended indoor ambient noise levels for residential dwellings.

Room	Criterion	$L_{Aeq,T}$	
		night	day
Bedroom	Sleeping	30	35
Dining Room/Area	Dining	--	40
Living Room	Resting	--	35

Table 3
Recommending indoor ambient noise level thresholds from anonymous noise (taken from Table 4, BS 8233:2014)

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

Internal noise levels in habitable rooms are calculated using either the simple or rigorous method as described in Annex G in BS 8233:2104.

3.2.1 Noise levels in external living areas

For external living areas such as gardens and balconies, BS 8233:2014 § 7.7.3.2 recommends an upper limit of 55dB $L_{Aeq,day}$ although there is a caveat:

However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

3.2.2 Maximum noise levels

In the 2014 edition of the Standard, the criterion of 45dB L_{AFMax} inside bedrooms has been removed although there is Note 4:

NOTE 4 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 LAmax,P depending on the character and number of events per night. Sporadic noise events could require separate values.

The use of the phrases 'may be set' and 'could require' imply that this is a discretionary criterion.

3.3 COUNCIL CRITERIA

It is usual that Councils adhere to noise levels given in BS 8233:2014.

L_{Aeq} 55 dB 16 hours – gardens and outside living areas, daytime (07.00-23.00)

L_{Aeq} 35 dB 16 hours – indoors, daytime (07.00-23.00)

L_{Aeq} 30 dB 8 hours – indoors, night-time (23.00-07.00)

4 MONITORING DETAILS

Extensive noise monitoring was taken in 2012 for the previous noise report from noise.co.uk. From spot noise measurements around the site, as well as monitoring the various activities within the existing industrial units, it seems that the noise climate has not significantly changed since the last noise monitoring. However, the previous noise monitoring did not include any road traffic noise from Charlestown Road, so this report will address this omission.

24 hours monitoring took place from 3rd floor of the proposed apartment building facing Charlestown Road.

4.1 MONITORING DETAILS

Personnel: John Braiden, BSc & MSc Acoustics, MIOA.

Weather: 14 - 18°C temperature; ~5ms^{-1} wind; ~60-80% cloud;

Equipment: NTi XL2 integrated real time analyser & B&K 4231 calibrator.

The sound level meter was calibrated before after the measurements with no significant drift reported.

Monitoring was unmanned with audio recorded.

4.2 MONITORING LOCATIONS

In total there have been four noise monitoring locations used in the assessment, as shown in Figure 3. Each location has had 24 hour monitoring.

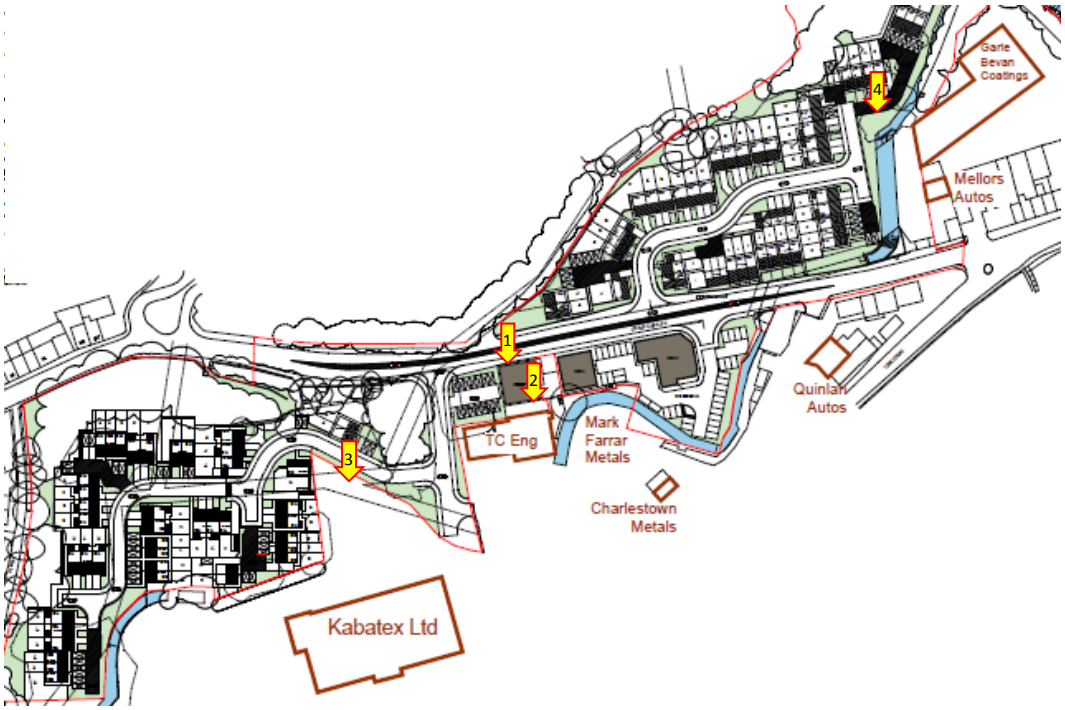

Figure 3
Monitoring locations

4.3 MONITORING RESULTS

Noise measurements were made over 24 hours and recorded every 5 minutes.

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At position 1, the microphone directly faced onto Charlestown Road. Due to the position, there was no other noise sources present at this location. Due to the high sided existing buildings on the other side of the road there was an obvious 'canyon effect' where road traffic noise was bouncing between the opposing buildings. In order to account for this effect, a noise measurement was made further down the road where there were no opposing high sided buildings and the noise level was 8 dB lower. Even when this has been accounted for, noise levels from the road traffic along Charlestown Road is still higher than the other locations.

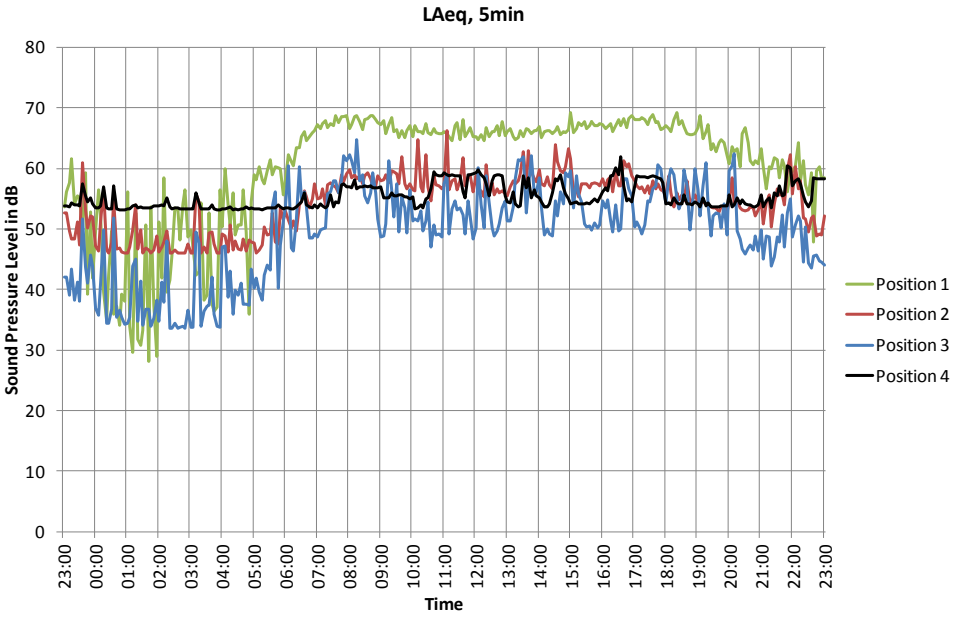

Figure 4
Time history of noise levels at location 1

Position 2 was at the rear of the former office building. Noise levels were primarily due to activity from TC Engineering and Mark Farrar Metals and, to a lesser extent, Kabetex. There was also some road traffic noise from Turnlee Road and the surrounding road network.

Position 3 was the lowest recorded noise levels as it was mainly vehicular movements from Kabatex Ltd. This section of the site is shielded from road traffic noise from both Turnlee and Charlestown Road due to its relatively low elevation.

Position 4 maintained a relatively consistent noise level as this part of the site is dominated by noise from Long Clough Brook.

Period	Position 1	Position 2	Position 3	Position 4
night	55.5	50.8	48.0	53.8
day	64.2	57.7	55.6	56.6

Table 4
Summary of day and noise 24 hours monitoring results – L_{Aeq}

5 ACOUSTIC ASSESSMENT

The required internal and external noise levels are given in section 3.3 and the amount of attenuation from the building façades were readily computed using the simple method in Appendix G of BS 8233:2014.

5.1 FAÇADE NOISE LEVELS

The site is large with many potential noise sources. However, noise results reveal that road traffic noise gives the highest noise levels. The monitoring locations shall be considered as the potentially noisy parts of the site and their noise levels compared with the internal noise thresholds to determine the sound reduction index of the glazing, as this is the weakest element of a building facade.

Location	period	room	External Levels measured / calc'd		Internal Levels recommended		Required glazing	
			L_{Aeq} (dB)	L_{Amax} (dB)	L_{Aeq} (dB)	L_{Amax} (dB)	SRI ($R_w + C_{tr}$)	Example Spec in mm
1	night	bedroom	56		30		**26**	8 / (6-20) / 4
	day	lounge	64		35		**29**	6 / (6-20) / 4
2	night	bedroom	51		30		**21**	4 / (6-20) / 4
	day	lounge	58		35		**23**	4 / (6-20) / 4
3	night	bedroom	48		30		**18**	4 / (6-20) / 4
	day	lounge	56		35		**21**	4 / (6-20) / 4
4	night	bedroom	54		30		**24**	4 / (6-20) / 4
	day	lounge	57		35		**22**	4 / (6-20) / 4

Table 5
Calculated SRI values and recommended glazing

Standard 4mm double glazed units [4 / (6-20) / 4] have a Sound Reduction Index (SRI) of 25 dB R_w+C_{tr}. This then applies to all habitable room on all facades *except for habitable rooms with line of sight to Charlestown Rad*. The affected dwelling facades are shown in yellow in Figure 5.

Table 5 gives an example glazing specification for a given Sound Reduction Index (SRI) performance.

5.1 GARDENS

Gardens with direct line of sight of Charlestown Road - see Figure 5 - should have close boarded timber fences with a surface density of 10 kg/m^2. This will give a sound reduction of 10 dB; hence noise levels in these gardens will be 54 dB $L_{Aeq,day}$ and below the upper limit of 55 dB.

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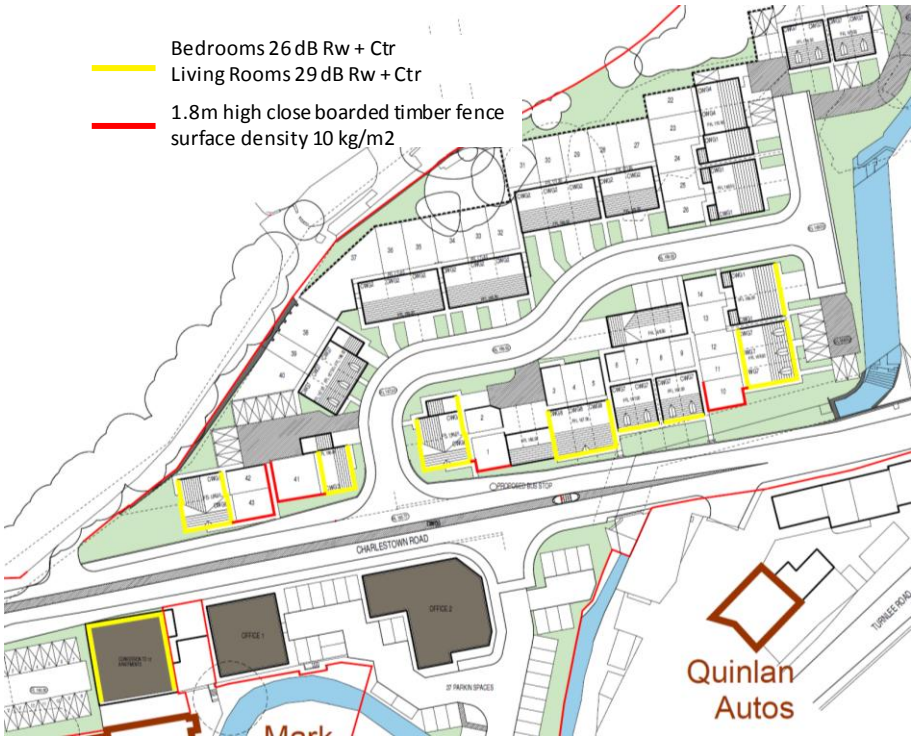


Figure 5
Locations of dwellings and gardens facing Charlestown Road

6 Conclusion

An acoustic survey has taken place at the Charlestown Works, Glossop to support a planning application for the erection of a selection of residential dwellings.

Standard double glazing can be fitted to all habitable rooms except facades with direct line of sight to Charlestown Rd. Furthermore, 1.8m close boarded timber fences with a surface density of 10 kg/m^2 should be erected alongside gardens with direct line of sight of Charlestown Road.

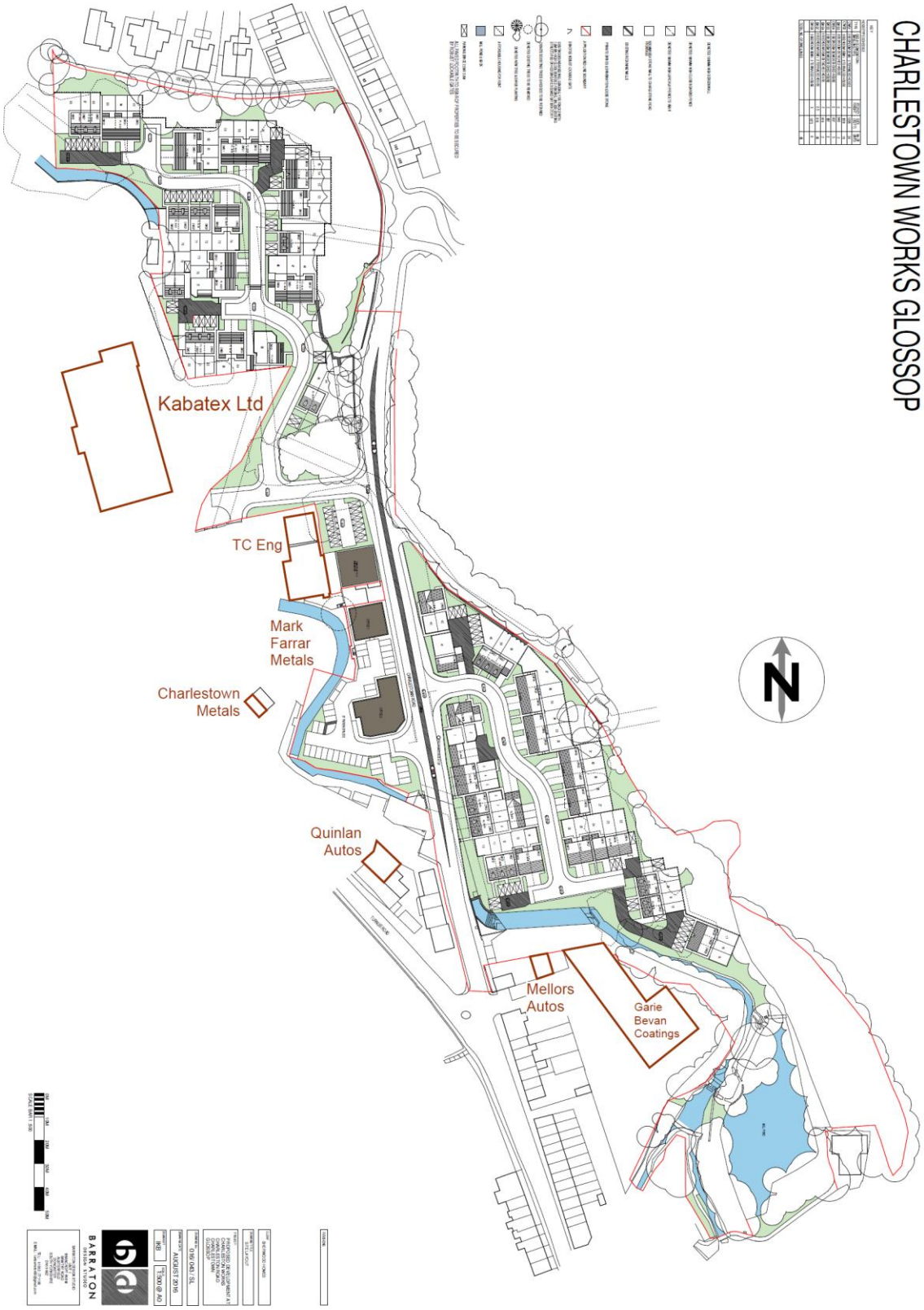
In conclusion, implementing the recommendations made in this report will safeguard the amenity of the occupants of the proposed dwellings against environmental noise.

7 References

[1] BS8233: 2014
Sound Insulation and noise reduction for buildings – Code of Practice,
British Standards Institute, 2014.

Appendix

A1 Drawings



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A2 GLAZING TYPES FROM PILKINGTON

Pilkington **Optiphon**™

Glass	Sound reduction index (dB)									
	Octaveband Centre Frequency (Hz)						$R_w(C;C_{tr})$	R_w	R_w+C	R_w+C_{tr}
	125	250	500	1000	2000	4000				
Single glazing										
6.8 mm Pilkington **Optiphon**™	26	27	31	36	40	39	36 (-1; -4)	36	35	32
8.8 mm Pilkington **Optiphon**™	24	28	34	38	37	43	37 (-1; -4)	37	36	33
9.1 mm Pilkington **Optiphon**™	26	29	34	38	38	43	37 (-1; -3)	37	36	34
12.8 mm Pilkington **Optiphon**™	30	32	37	39	41	51	39 (0; -2)	39	39	37
13.1 mm Pilkington **Optiphon**™	30	33	37	40	41	50	40 (0; -2)	40	40	38
Insulating glass units										
6 mm / 16 mm argon / 6.8 mm Pilkington **Optiphon**™	22	27	35	42	41	48	38 (-2; -5)	38	36	33
6 mm / 16 mm argon / 8.8 mm Pilkington **Optiphon**™	24	26	40	48	46	54	41 (-3; -7)	41	38	34
8 mm / 16 mm argon / 9.1 mm Pilkington **Optiphon**™	24	29	41	47	47	55	43 (-3; -7)	43	40	36
10 mm / 16 mm argon / 9.1 mm Pilkington **Optiphon**™	29	33	44	46	49	57	45 (-2; -5)	45	43	40
8.8 mm Pilkington **Optiphon**™ / 16 mm argon / 12.8 mm Pilkington **Optiphon**™	26	36	46	50	52	63	47 (-2; -7)	47	45	40
9.1 mm Pilkington **Optiphon**™ / 20 mm argon / 13.1 mm Pilkington **Optiphon**™	29	39	49	52	55	63	50 (-3; -8)	50	47	42

Measurements undertaken in accordance with BS EN ISO 10140 and R_w (C; C_{tr}) determined in accordance with BS EN ISO 717-1
For insulating glass units, there is little difference in the sound insulation for cavity widths in the range 6 to 16 mm
Pendulum body impact resistance to BS EN 12600 for all Pilkington **Optiphon**™ is Class 1 (B) 1
To achieve low U values in insulating glass units, Pilkington **Optiphon**™ can be combined with low emissivity glass from the Pilkington **K Glass**™ or Pilkington **Optitherm**™ ranges
To calculate performance data for Pilkington products, please use our Spectrum online calculator at www.pilkington.co.uk/spectrum
For glass combinations to achieve an R_w value higher than 50 dB, please contact us for more details

Sound insulation data for standard products

Glass	Sound reduction index (dB)									
	Octaveband Centre Frequency (Hz)						$R_w(C;C_{tr})$	R_w	R_w+C	R_w+C_{tr}
	125	250	500	1000	2000	4000				
Single glazing										
4 mm Float Glass	17	20	26	32	33	26	29 (-2; -3)	29	27	26
6 mm Float Glass	18	23	30	35	27	32	31 (-2; -3)	31	29	28
8 mm Float Glass	20	24	29	34	29	37	32 (-2; -3)	32	30	29
10 mm Float Glass	23	26	32	31	32	39	33 (-2; -3)	33	31	30
12 mm Float Glass	27	29	31	32	38	47	34 (0; -2)	34	34	32
6 mm Laminated Glass	20	23	29	34	32	38	32 (-1; -3)	32	31	29
8 mm Laminated Glass	20	25	32	35	34	42	33 (-1; -3)	33	32	30
10 mm Laminated Glass	24	26	33	33	35	44	34 (-1; -3)	34	33	31
12 mm Laminated Glass	24	27	33	32	37	46	35 (-1; -3)	35	34	32
Insulating glass units										
4 mm / (6 - 16 mm) / 4 mm	21	17	25	35	37	31	29 (-1; -4)	29	28	25
6 mm / (6 - 16 mm) / 4 mm	21	20	26	38	37	39	32 (-2; -4)	32	30	28
6 mm / (6 - 16 mm) / 6 mm	20	18	28	38	34	38	31 (-1; -4)	31	30	27
8 mm / (6 - 16 mm) / 4 mm	22	21	28	38	40	47	33 (-1; -4)	33	32	29
8 mm / (6 - 16 mm) / 6 mm	20	21	33	40	36	48	35 (-2; -6)	35	33	29
10 mm / (6 - 16 mm) / 4 mm	24	21	32	37	42	43	35 (-2; -5)	35	33	30
10 mm / (6 - 16 mm) / 6 mm	24	24	32	37	37	44	35 (-1; -3)	35	34	32
6 mm / (6 - 16 mm) / 6 mm Laminated	20	19	30	39	37	46	33 (-2; -5)	33	31	28
6 mm / (6 - 16 mm) / 10 mm Laminated	24	25	33	39	40	49	37 (-1; -5)	37	36	32

The above are generally accepted values for generic products taken from EN 12758. They are conservative values that can be used in the absence of measured data.
Data for laminated glass is based on pvb interlayers (excluding acoustic pvb interlayers). Glass thickness for laminated glass excludes interlayer thickness.
Data can be adopted for air or argon gas-filled cavities

R_w = Weighted sound reduction. This scale allows for the response of the human ear and could be used for determining a suitable product to reduce noise such as voices.
C = An adjustment to the R_w scale that could be used for selecting a product to reduce noise from music, radio, tv, high speed traffic and other medium to high frequencies.
C_{tr} = An adjustment to the R_w scale that could be used for selecting a product to reduce noise from urban road traffic, disco music and other noises with a large component of low frequencies.

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