BRAIDEN ACOUSTICS LTD

Innovation Forum // 51 Frederick Road // Salford // Manchester // M6 6FP

NOISE IMPACT ASSESSMENT

Prepared For :	Abdel Razak Alanezy	Date :	4 Sep 2023
Site :	302 Platt Lane, Rusholme	Report No. :	11065revA

1 INTRODUCTION

Braiden Acoustics has been commissioned by Abdel Razak Alanezy to undertake an acoustic survey at the site of the 302 Platt Lane, Rusholme in order to discharge noise conditions related to planning permission 135837/FO/2022 which proposes:

Change of use from shop at the ground floor into launderette [sui generis] with associated seating area together with the installation of flue to the rear

The pertinent noise conditions are as follows:

4) a) The premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences .

b) Prior to first use of the development a verification report shall be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that acceptable criteria have been met.

Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To safeguard the amenities of the occupiers of the building and occupiers of nearby properties.

5) a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to ***achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location****. Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.*

b) Prior to the operation of the agreed scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of nonconformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site.

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7) The premises shall not be open outside the following hours:-

0900 - 2000hrs Monday to Sunday

Reason - In interests of residential amenity in order to reduce noise and general disturbance in accordance with saved policy DC26 of the Unitary Development Plan for the City of Manchester and policies SP1 and DM1 of the Core Strategy.

The three noise conditions can be summarised as follows:

Condition 4:	Noise breakout from the premises	
Condition 5:	Noise from external plant	
Condition 7:	Opening hours	09:00 – 20:00

For Conditions 4 & 5, there are two phases:

a) an initial acoustic survey with recommendations for solutions in order to meet relevant acoustic standards and guidelines,

b) a verification acoustic survey once the works have been completed to determine if relevant acoustic thresholds have been met.

1.1 Aim

This report assesses potential noise impact on the nearest sensitive receiver (NSR), focussing on the issues raised in the above conditions, so that they can be partially discharged.

2 Description of site

The proposed site is a two-storey red brick end of terrace property within a commercial parade. There is an alley to the side of the property with access to the rear yard. The ground floor has been in commercial use as an estate agency with residential use at first floor.

Figure 1
Proposed site street view

2.1 Site location and surrounding area

The site is bounded by Platt Lane to the south, an alleyway to the west and an adjoining property to the east.

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Figure 2
Site and surrounding uses

2.1.1 Nearest sensitive receptor

The nearest sensitive receiver (NSR) is the residential apartment on the first floor.

2.2 PROPOSED USE

The application seeks to change the use of the ground floor into a laundrette with the following equipment:

- 6no. JLA 30 Tumble Dryers
- 5no. JLA Washing Machines
    - 2 x T20
    - 1 x T30
    - 2 x T40

The rear of the six dryers will connect to a passive ducted system and vent at the rear, as shown in the figure below.

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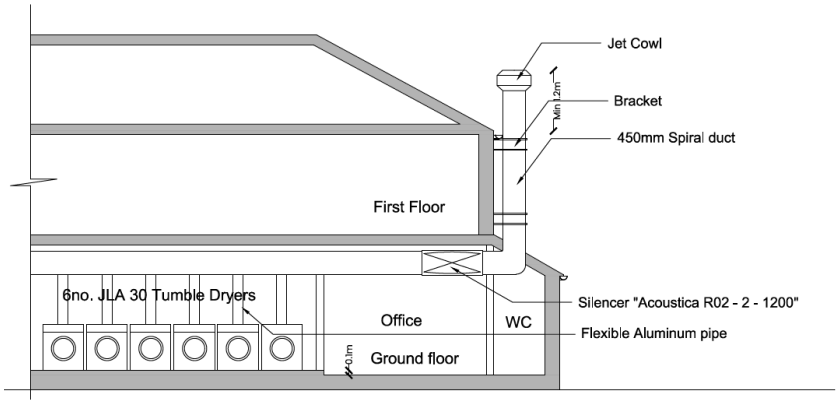


Figure 3
Section drawing showing the ducted exhaust system

There will be a 150mm Ø duct from the back of each dryer and then turn 90° upwards into a 200mm Ø duct and rise approximately 1800mm to a common 450mm Ø duct which will be routed to the rear of the unit, turn 90° upwards, penetrate the single storey extension and rise vertically to, at least, 1m above the eaves.

The proposed ground floor layout is shown below.

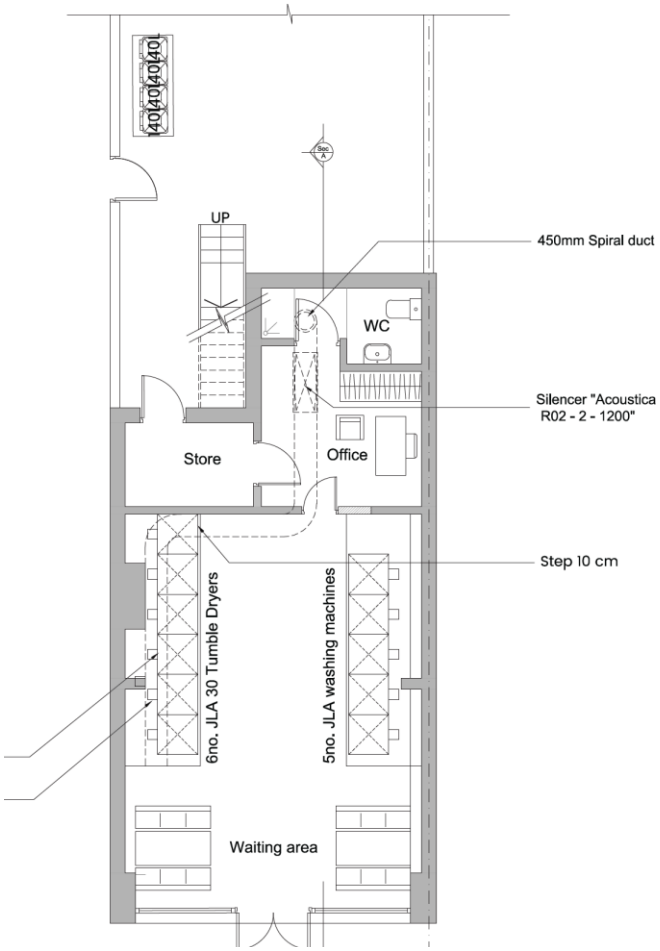


Figure 4
Proposed floor layouts

2.2.1 Building services

There will be no other building service, except for the extraction system for the dryers.

2.2.2 Opening hours

Condition 7 of the planning permission states that the permitted opening hours are:

Opening hours	09:00 – 20:00	seven days a week

3 Acoustic criteria and methodology

Potential mitigation measures are determined by recommended indoor noise levels from BS 8233 "Sound insulation and noise reduction for buildings" [i] 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 daytime – 0700-2300 hrs.

3.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework is the current document for planning guidance. Paragraph 180 of the revised NPPF states:

> *180. 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:*
>
> *a) mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
>
> *c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

Paragraph 180 refers to the Noise Policy Statement for England which shall be briefly discussed in the next Section.

3.2 Noise Policy Statement for England

The main aim of the Noise Policy Statement is to:

> *Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.*

Therefore, the NPSE is mainly concerned with environmental noise.

The document sets out categories in order to help distinguish is if there is an adverse effect due to noise and if there is, how significant is it.

> *NOEL – No Observed Effect Level*
> *This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*
>
> *LOAEL – Lowest Observed Adverse Effect Level*
> *This is the level above which adverse effects on health and quality of life can be detected.*
>
> *SOAEL – Significant Observed Adverse Effect Level*
> *This is the level above which significant adverse effects on health and quality of life occur*
>
> *It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise.*

However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

3.3 BS 4142

BS 4142:1999 "Method for rating industrial noise affecting mixed residential and industrial areas" [ii] assesses industrial noise with regards to nearby residential dwellings. The guidance is commonly used to compare the equivalent noise from an industrial source only (*specific noise level*), L_{Aeq}, to the background noise level, L_{A90}, at the nearest sensitive receptor (NSR).

This Standard has been recently updated, BS 4142:2014 "Methods for rating and assessing industrial and commercial sound" [iii]. Whereas the old standard added 5dB 'penalty' to the Specific Noise Level (SNL) if the noise source has a 'character' that can draw attention that may be described as tonal, intermittent or impulsive, the new standard gives clearer guidance on noise 'character'. Furthermore, the previous Standard gave only one 5 dB penalty whereas the new Standard may not. When added to the specific noise level it forms the *rating level*. The new Standard gives the guidance for the following types of noise character:

Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

Correct the specific sound level if a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.

NOTE 1 The prominence of tonal or impulsive sound from a source can be masked by residual sound. In many cases the amount of masking varies as the residual sound changes in level and possibly character. The source's tonal and/or impulsive characteristics could also vary with time.

Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.

Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the

reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Once a penalty for noise character is added to the Specific Noise Level then this is termed the *Rating Level*.

The background level is then compared to the rating level. It is usual that the rating level due to the source should be below the background noise level at the nearest sensitive receptor; indeed BS 4142 states:

"The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

3.4 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 1
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.

3.4.1 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.

3.4.2 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.

3.5 COUNCIL CRITERIA

3.5.1 Residential noise levels

The noise criteria from condition 8 are as follows:

• *35dB LAeq (16hr) from 0700 to 2300 within living rooms*

• *30dB LAeq (8hr) from 2300 to 0700 within bedrooms*

• *45dB LAFmax (individual noise events shall not exceed 45 dB LAmax,F by more than 15 times) within bedrooms*

• *50dB LAeq (16hr) from 0700 to 2300 for outdoor living areas*

3.5.2 Industrial noise levels

The noise criterion from condition 9 are as follows:

Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L Aeq) below the typical background (L A90) level at the nearest noise sensitive location.

4 Monitoring Details

4.1 Site visit 1 – rear

4.1.1 Monitoring details

Personnel:	John Braiden, BSc & MSc Acoustics, MIOA.
Weather:	6-13-°C temperature; ~5ms^{-1} wind; ~20-40% cloud;
Equipment:	NTi XL2 integrated real time analyser & B&K 4231 calibrator.
Date:	Saturday 7th May 2023.

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

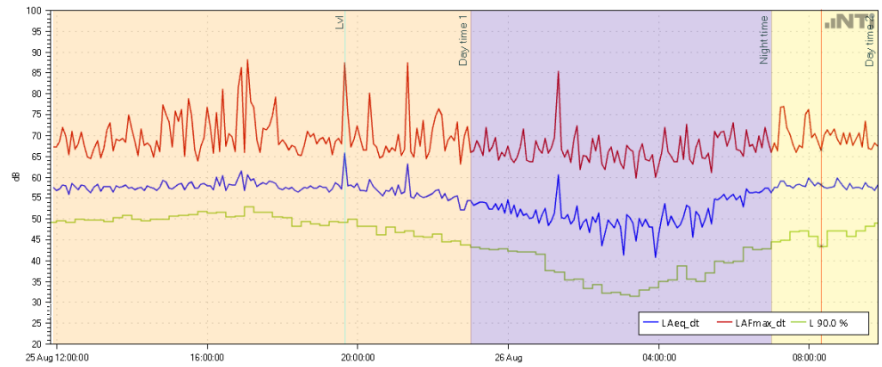
Monitoring was unmanned with audio recorded.

4.1.2 Monitoring location

The microphone was on an extending boom at least one metre from a first-floor window to the rear.

4.1.3 Monitoring results

Noise levels were measured continuously for over 26 hours.



Cursor: Position=2022-08-26 08:20:00 LAeq_dt=58.0 dB LAFmax_dt=66.5 dB L 90.0 %=43.4 dB

Figure 5
Time history - REAR

Noise levels at the rear benefited from shielding from the road traffic noise on Platt Lane. There were some existing plant noise sources to the rear.

The lowest Background Noise Level when the laundrette would be open is 43.4 dB L_{A90}.

Time		Duration	Time Period	L_{A90} dB	L_{Aeq} dB	L_{Amax} dB
Start	Finish					
11:52:58	23:00:00	11:07:02	day	48.3	57.7	88.1
23:00:00	07:00:00	08:00:00	night	34.6	52.5	85.3
07:00:00	09:49:20	02:49:20	day	46.3	58.0	76.9

Table 2
Summary of noise monitoring results

5 Acoustic Assessment

5.1 External Plant

5.1.1 Methodology

The sound power of the extract of each dryer is unknown. However, the fan within the dryers is 350mm Ø, hence the sound power from a 350mm Ø duct fan has been used as relatively good estimate – the fan used for the noise calculations is the Helios Gigabox GBD 355/4/4.

From there, the sound power in the duct will have the same sound power in the main branch added to the sound power of each branch, which will cumulatively add to achieve the final sound power in the common duct, once all the dryers have contributed.

$$SWL_{new} = SWL_{main} + SWL_{branch}\frac{A_{branch}}{A_{main}} \quad (1)$$

where SWL = sound power level within the room (SPL), dB

$SPL_{int,rev}$ = internal reverberant SPL, dB

$\bar{\alpha}$ = Average sound absorption coefficient

A = area of duct, m^2

The sound power, in the large 450mm duct, from each dryer, has been summed and then the sound pressure is calculated at the nearest window to the cowl of the vertical external duct.

Duct noise calculations have included the fans' sound power level, type and length of duct, bends, attenuators and end reflection.

Noise propagation has taken account for distance and barrier attenuation due to any shielding, where appropriate.

The assessment location is the nearest residential window to the extract fan. It must be noted that the nearest habitable window is on the side elevation and the extract fan is on the rear elevation.

Full noise propagation calculations are shown in the Appendix.

5.1.2 BS4142 assessment

BS 4142 Noise Assessment Extract Duct	Value	dB
Total Specific Noise Level @ NSR		16
BS 4141		
Tonality	0/2/4/4	2
Impulsivity	0/3/6/9	0
Intermittency	0/3	3
Rating Noise Level		**21**
LAF90_day		43
Rating minus Background		**-22**
Target Met?		✓

Table 3
BS4142 assessment – Extract

The BS4142 assessment shows that the Rating Level of the extract duct, at the nearest resident, is a 22dB less than the Background Level and hence well within acceptable limits and of 'low impact'.

5.2 INTERNAL NOISE TRANSFER

5.2.1 Internal noise level in laundrette

The noise emissions from each machine type are shown in the table below.

Machines		No of units	Noise Emission	L_{Aeq} (LOW)	L_{Aeq} (HIGH
Type	Model Number			dB	dB
Dryer	JLA 30	6	SPL @ 1m	59	59
Washer	JLA T20	2	SPL @ 1m	52	61
Washer	JLA T30	1	SPL @ 1m	59	66
Washer	JLA T40	2	SPL @ 1m	59	66

Table 4
Noise levels of dryers & washers

The reverberant sound level within the room is taken from equation 5.5 in Woods [iv]:

$$SPL_{int,rev} = SWL - 10\log\left(S\frac{\bar{\alpha}}{1-\bar{\alpha}}\right)+6 \qquad (2)$$

where SWL = Total sound power level within the room (SPL), dB

$SPL_{int,rev}$ = internal reverberant SPL, dB

$\bar{\alpha}$ = Average sound absorption coefficient

S = Total surface area of room, m^2

The noise level of each machine is assumed to be the measured noise level at one meter and in a hemi-anechoic environment. Therefore, the reverberant sound power (SWL) is calculated thus:

$$SWL = SPL + 20\log r + 8 \quad (3)$$

where SPL = sound pressure level, dB

SWL = Sound power level, dB

r = Measuring distance, m

Logarithmically summing the sound power levels of all of the washers and dryers given in Table 4 equates to 80dB. Using the above two equations, the reverberant noise level with the laundrette will be:

68 dB.

Therefore, it is safe to assume that the typical noise level with the laundrette should not exceed 70 dB.

5.2.2 Ground to First Floor

5.2.2.1 Proposed ceiling upgrade

It is proposed to remove with existing suspended ceiling to reveal the original ceiling. The original ceiling should be checked and 'made good/ where appropriate. Once made-good, there should be an independent ceiling underdrawn that conforms to Floor Treatment 1 in Approved Document E.

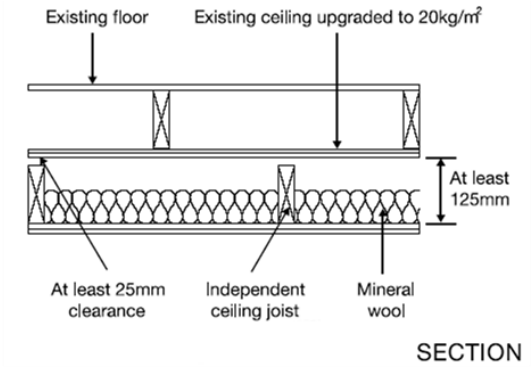


Figure 6
ADE Floor treatment 1 - Independent ceiling with absorbent material

The resistance to airborne and impact sound depends on the :

- the combined mass of the existing floor and the independent ceiling,
- the absorbent material,
- the isolation of the independent ceiling and
- the airtightness of the whole construction.

The construction of the separating floor is as follows:

- ***make good original ceiling so that it is airtight***;
- the independent ceiling shall be supported by independent joists fixed only to the surrounding walls. A clearance of at least 25mm should be left between the top of the independent ceiling joists and the underside of the existing ceiling.
- any supporting beams should sit within the cavity of the independent ceiling
- at least 2 layers of 15mm acoustic plasterboard with staggered joints, minimum mass per unit area 20kg/m2;

- an absorbent layer of mineral wool laid on the ceiling , minimum thickness 100mm, minimum density of 10 kg/m3

NB** The plasterboards attached to the underside of the independent ceiling should be below any beams, so that the beams are within the cavity of the independent ceiling. Please contact Braiden Acoustics for further information.

For services such as lights, smoke alarm etc. then there should be a sacrificial ceiling as shown below.

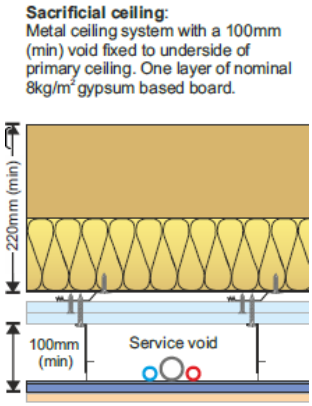


Figure 7
Typical sacrificial ceiling

The sacrificial ceiling should be directly screwed to the underside of the joists of the acoustic ceiling above.

The acoustic ceiling should create a minimum of 100mm cavity.

One layer of standard plasterboard is sufficient for the sacrificial ceiling, as it will have no real acoustic performance.

5.2.2.2 Noise transfer to first floor flat

The above construction described in Section 5.2.2.1 will give an on-site sound insulation performance of, at least, 50 dB. Considering that the likely upper noise level in the laundrette will be 70 dB(A), as described in Section 5.2.1, then the noise level in the first-floor accommodation will be 70 – 50 = 20 dB. This is 15 dB below the 35 dB daytime internal noise limit in habitable spaces.

5.2.2.3 Vibration

All washing machines, dryers and ductwork should be connected to the building use anti-vibration mounts.

6 Conclusion

An acoustic survey has taken place at the 302 Platt Lane, Rusholme to discharge noise conditions relating to a planning application for the erection of a new building with A1 retails at ground floor and storage and a flat on first floor level.

Condition 5 – Noise from external plant

Details of the extract ventilation systems have been proposed and assessed, with the following mitigation measures:

- 1no. Acoustica R02-2-1200 silencer

Condition 4 – Noise breakout from the ground floor unit

The construction of the separating floor is as follows:

- ***make good original ceiling so that it is airtight***;
- an independent ceiling shall be supported by independent joists fixed only to the surrounding walls. A clearance of at least 25mm should be left between the top of the independent ceiling joists and the underside of the existing ceiling.
- any supporting beams should sit within the cavity of the independent ceiling;
- at least 2 layers of 15mm acoustic plasterboard with staggered joints, minimum mass per unit area 20kg/m2;
- an absorbent layer of mineral wool laid on the ceiling , minimum thickness 100mm, minimum density of 10 kg/m3

NB** The acoustic ceiling shall NOT be penetrated, but if absolutely necessary than is shall be fully sealed using appropriate building methods. Contact Braiden Acoustics for further advise if need be.

For services such as lights, smoke alarm etc. then there should be a sacrificial ceiling as described in the report.

Pending the recommendations in this report, Conditions 4 & 5 can be partially discharged.

7 References

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

[ii] BS 4142: 1997
Method for Rating industrial noise affecting mixed residential and industrial areas
British Standards Institute, 1997.

[iii] BS 4142: 2014
Methods for rating and assessing industrial and commercial sound
British Standards Institute, 2014.

[iv] Ian Sharland
Fläkt Woods Practical Guide to Noise Control
Fläkt Woods Limited, Colchester, England, 2005.

Appendix

A1 Extract duct calculation

302 Platt Ln, Fallowfield M14 7BZ			Duct Calculation	Dryer Extracts	Octave band centre frequency								
Item	Quantity		Description	Details	63	125	250	500	1000	2000	4000	Total level	
1a			Sound Pressure Level @ Xm	SWL data used	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1b			Sound Power Level of unit	Helios Gigabox GBD 355/4/4, Lw OUT	72.1	72.1	68.6	68.2	63.0	58.8	55.0	76.9	
2			PLENUM Insetion Loss	no									
3	2	m	Duct Length in metres	Round 100 – 300	-0.2	-0.2	-0.2	0.0	0.0	0.0	0.0		
4	1		Number of bends	500mm round bend	-3	-3	-6	-9	-9	-9	-9		
5	200	mm	Branch area	10log(branch mm2/duct mm2)	-7	-7	-7	-7	-7	-7	-7		
			Sound Power_new	X	62	62	55	52	47	43	39		
	N	6	Number of sources	10*log(N)	7.8	7.8	7.8	7.8	7.8	7.8	7.8		
4	3		Number of bends	500mm round bend	-3	-3	-6	-9	-9	-9	-9		
6			Silencer attenuation (1)	R02 - 2 - 1200	-11	-20	-20	-50	-50	-50	-50		
7			Silencer attenuation (2)	no silencer or n/a	0	0	0	0	0	0	0		
8			Att due to end reflection	500 mm end reflection	-8	-4	-1	0	0	0	0		
9			Louvre attenuation	no acoustic louvre or n/a	0	0	0	0	0	0	0		
			A weighting	yes	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0		
10			Sound power at termination		21.4	26.5	27.5	-2.3	-4.3	-7.3	-11.3	30.6	
			Directivity	0.25m2 @ 80° - 1 surface	2	1	-1	-1	-4	-30	-30		
11	Q	1	Directivilty @ 0deg	0 surfaces	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
12	1	m	Distance Attenuation	20*log10(r)	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			Air absorption	15°C; 80% humidity	0.00	0.00	0.00	0.00	0.00	-0.01	-0.02		
			Numerical correction	SPL = SWL - 20log(r) +DI - 11	-11.00	-11.00	-11.00	-11.00	-11.00	-11.00	-11.00		
	δ	0	Barrier	yes	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8		
			SPL(A) at NSR	$L_{p,NSR}$	**7.7**	**11.8**	**10.8**	**0.0**	**0.0**	**0.0**	**0.0**	**15.7**	**dB**

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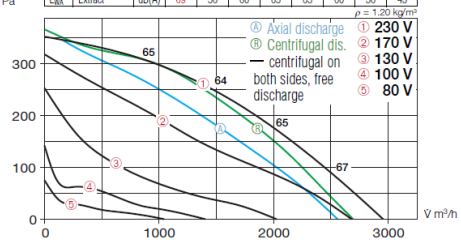
A2 EXTRACT FAN DATA

GigaBox centrifugal fan 355 mm ø

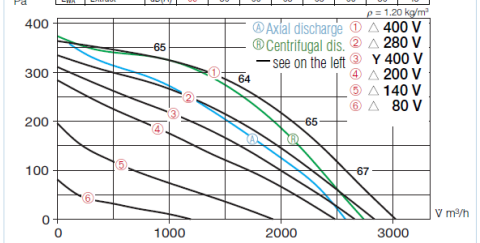
GBW 355/4

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	54	46	50	49	44	39	28	25
L_{WA}	Intake	dB(A)	66	54	55	61	61	58	54	41
L_{WA}	Extract	dB(A)	69	56	60	65	63	60	56	45



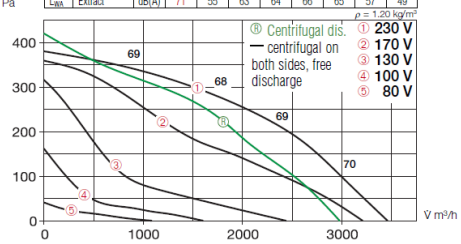
GBD 355/4/4

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	54	46	50	49	44	39	28	25
L_{WA}	Intake	dB(A)	66	54	55	61	61	58	54	41
L_{WA}	Extract	dB(A)	69	56	60	65	63	60	56	45



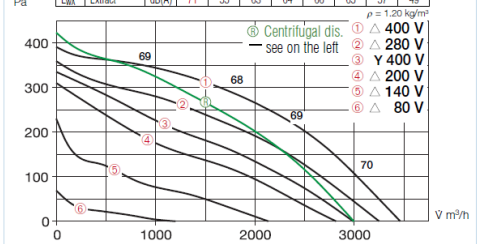
GBW 355/4 T120

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	56	48	52	49	47	44	41	38
L_{WA}	Intake	dB(A)	69	55	61	63	62	63	58	48
L_{WA}	Extract	dB(A)	71	55	63	64	66	65	57	49



GBD 355/4/4 T120

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	56	48	52	49	47	44	41	38
L_{WA}	Intake	dB(A)	69	55	61	63	62	63	58	48
L_{WA}	Extract	dB(A)	71	55	63	64	66	65	57	49



GigaBox

Motor protection
Motors have thermal contacts wired to the terminal block and must be connected to a motor protection unit.

Speed control
All types are speed controllable by voltage reduction using a transformer controller. The 3-phase models can also be 2 speed controlled by star/delta switch (accessories DS 2 or full motor protection unit M 4). The duties at different speeds are given in the performance curve.

Sound levels
Total sound power levels and the spectrum figures in dB(A) are given for:
- sound level case breakout
- sound level intake
- sound level extract

in the tables above the performance curve. Beside, the sound power level (on intake) is stated over the rated characteristic curve. In the table below you can also find the
- case breakout level at 4 m (freefield conditions).

Accessories of both types

Anti vibration mounts for installation indoors. Set of 4.
SDD-U Ref. No. 5627

Wall bracket for wall mounting.
GB-WK 355 Ref. No. 5625

External weather louvers to cover exhaust opening.
GB-WSG 355 Ref. No. 5638

Outdoor cover hood for outdoor installation.
GB-WSD 355 Ref. No. 5747

On/Off and 2-speed switch for 3-phase star/delta motors.
DS 2 [3] Ref. No. 1351

[3] full motor protection unit recommended: MD Ref. No. 5849

Information	Pages
Design of systems, acoustic	12 on
General techn. information, speed control	17 on

Accessory-Details	Pages
Speed controller and full motor protection unit	397 on

Specific accessories

for types GB..
Condensate collector with condensate spigot for pipe connection.
GB-KW 355 Ref. No. 5643
(Condensate collector with condensate spigot included in delivery with GB.. T120).

for types GB.. T120
Rain drainage for outdoor installation (drill holes for rain drainage is already prepared).
GB-RA Ref. No. 9418

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