



Pizza Express Delivered
256 ShinField Road Reading RG2 8EY

Environmental Noise Report

15P916 JT R2010-418a

04 December 2015

James Tomalin



256 ShinField Road Reading RG2 8EY

Environmental Noise Report

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document control

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256 Shinfield Road Reading RG2 8EY

Environmental Noise Report

Introduction

Aulos Acoustics has been appointed by Pizza Express (Restaurants) Ltd to investigate environmental noise emissions at the proposed Pizza Express Delivered branch at 256 Shinfield Road Reading RG2 8EY.

A planning application is to be made constituting a change of use. The details of the application are provided in the application form, planning statement and design and access statement.

The branch includes the provision of ventilation and air conditioning mechanical equipment to kitchen and refrigeration areas, including kitchen extract and supply fans.

The branch will provide delivery food services and has provision for approximately 15 electric scooters.

Some minor goods deliveries are expected.

The application site represents a noise-generating use requiring an investigation of the effect of noise impact on amenity of nearby or adjacent residential property. The principal noise sources of concern are:

- Heating, Ventilation, Air Conditioning & Energy Equipment

Secondary sources of interest are:-

- Delivery vehicles and servicing

The principal noise-sensitive receivers are those located at:-

- Immediately above 256 Shinfield Road
- Adjacent flats above row of shops
- 258 Shinfield Road
- 4-10 Whitley Wood Road

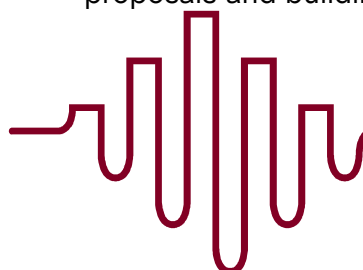
Most of these premises are co-located with commercial properties or between commercial properties, including food, drink and late night uses.

These are the positively identified residential properties. Other residential property is significantly more distant.

Basis of Assessment

A previous HVAC mechanical equipment installation has been permitted under Reading Borough Council Planning Permission 131251 FULL dated 1 November 2013, however the level of detail was limited and implementation of the planning permission is subject to a number of pre-commencement conditions requiring this information to be submitted to the council.

The current application provides a more detailed submission and includes equipment selection proposals and building services drawings.



The advice provided by Jodie Wilson [Senior Environmental Health Officer, Environmental Protection & Nuisance, Directorate of Environment & Neighbourhood Services, Reading Borough Council email dated 19/10/2015 11.00h] is that the kitchen extract shall be assessed under *Defra Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems (January 2005)*.

Annex D provides guidance on the factors to take account of in noise assessment. The indicated guidance provides for BS4142:1997 assessment of noise emitted by the fan system.

The DEFRA guidance does not include kitchen supply systems, air conditioning equipment or refrigeration equipment, or any other building services noise associated with a development. The omission is a major flaw in the guidance as most food uses requiring an extract fan will require these other systems also.

Additionally, BS4142:1997 has been superseded.

An investigation and assessment has been completed in accordance with BS4142:2014 (1) to determine the environmental noise climate and establish any building services noise emissions important to the assessment.

The results of the survey and calculations are included at Appendix D and shall be considered as the primary reference under the BS4142 requirements.

Further consideration is given to vehicle noise in Appendix E with reference to the measured noise climate.

The following report summarises the outcome and conclusions of the investigation and assessment.

Reference shall be made to the datasheets, site plans and architectural drawings included in the application.

Planning Framework

The proposed installation is assessed against the requirements of the Local Planning Authority planning control policies and the national planning policy as defined in the following documents:-

- National Planning Policy Framework (NPPF) (2)
- Noise Policy Statement for England (NPSE) and Explanatory Note (3)
- Planning Practice Guidance – Noise (4)

The LPA is Reading Borough Council and requires mechanical equipment noise levels to be controlled to low noise levels.

The reference measurement and assessment method for such investigations is described in BS4142:2014 (1), which is the extant Standard applicable to such assessments.

Local Development Control

Reading Borough Council has not defined the target sound levels for such development.

Similar developments and the previous planning permission incorporate a general target of 10dB(A) below background sound level when assessed under BS4142:2014.



No differentiation is made between day and night or between types of equipment or their distinctiveness.

The noise targets may be summarised as a Rating Level:-

- Equipment noise 10dB(A) below the Background Sound Level at 1m from the nearest residential window

Where equipment only operates during the day and is not distinctive (as described by BS4142) a 5dB(A) relaxation of the target noise levels is reasonable and acceptable in terms of the impact on residential amenity, in the author's view. This may be summarised as a Rating Level:-

- Daytime equipment noise 5dB(A) below the Background Sound Level at 1m from the nearest residential window
- "Not distinctive" equipment noise 5dB(A) below the Background Sound Level at 1m from the nearest residential window

Such moderated targets are reasonable as they ensure noise mitigation measures are not disproportionately complex when there is a low risk of adverse noise impact. Any exacerbating factors are taken into account in the BS4142 rating process, where applicable.

The Background Sound Level is the LA90,T. The stated period is not given but is presumed to accord with BS4142:2014 being one hour daytime and 15-minutes night-time.

Day is 07.00-23.00 hours and night is 23.00-07.00 hours as defined in BS4142 and elsewhere.

Prevailing Noise Climate

Based on direct observations and listening, the ambient noise climate at the application site is determined by road traffic and commercial building services equipment noise. There are a range of condenser units and extract ventilation units in the vicinity. Road traffic movements are moderate.

The weather conditions were reasonable for a background noise level with low wind speeds, mild temperatures and little precipitation, although there was some sporadic light rainfall (i.e. drizzle). The latter does not appear to have had any discernible effect on either noise level or frequency content in the quietest periods.

Following inspection of the area, the risk of significant impact from the proposed equipment was considered moderate. The residential receivers are near and the equipment installation is significant, but not substantial.

Also, ventilation equipment is limited to "short" operating hours 11.00-23.30h and only catering condensers will operate continuously.

The noise climate appears to be reasonably consistent over the time observed.



Environmental Noise Survey

To establish the components and magnitude of the noise climate, a noise survey was required. The type of survey and methodology has been determined with reference to Local Planning Authority guidance and/or relevant British Standards and guidance.

A continuous survey was completed to establish the current noise levels and, if possible, the background noise. The details and results are reported in in Appendix D.

The meter and microphone were installed at Position 1 at the rear of the application site.

This is the quietest side of the building and is screened from direct noise of road traffic. It is subject to limited reflection, but the measurement results are free-field.

The results and details of the survey are reported in Appendix D in general accordance with the requirements of the following documents:-

BS7445 (5) (6) (7)

BS4142:2014 (1)

BS8233:2014 (8)

Results

The details and results of the survey were analysed and are reported in Appendix D page D1-D4. These confirm that the measurements of the noise climate are within expectations.

The “Short Operating Time” of the branch will be 11.00-23.30 hours with equipment operating times presumed to be as follows:-

- Kitchen extract and supply fans 11.00-23.30 hours
- Air conditioning units 11.00-23.30 hours
- Catering refrigeration / freezer units 24-hours

A longer operating / opening time has been considered also, which is consistent with the noise assessment of the current permission.

Background sound levels are moderate to low and were measured as:-

- | | | | |
|------------------------|--------------|------|----------------------|
| • Daytime | LA90,1hour | 46dB | 07.00-23.00h minimum |
| • Short Operating Time | LA90,15-mins | 43dB | 11.00-23.30h minimum |
| • Long Operating Time | LA90,15-mins | 40dB | 11.00-01.00h minimum |
| • Night-time | LA90,15-mins | 37dB | 23.00-07.00h minimum |

As the “daytime” measurements were limited, the minimum above is that up till 23.00 hours or after 07.00 hours if this is lower. It would be unusual for these not to be the minima.

Inspection of the area and knowledge of the prevailing and typical noise climate, would indicate the background noise level is reasonable for a sheltered position.

Inspection at the site indicates noise levels are variable in other locations at the front of the premises. For the purposes of the assessment, the sound levels are assumed to be at least 5dB(A) higher at the front of the premises and 3dB(A) higher at Receiver 2 as indicated in Appendix D2.



Ambient sound levels during the day are moderate at the measurement position, but have not been used to determine impact of mechanical equipment. At the rear these are typically:-

- | | | | |
|------------------------|-------------------|------|-----------------|
| • Evening | LAeq 07.00-23.00h | 54dB | |
| • Short Operating Time | LAeq 11.00-23.30h | 53dB | 26/11/2015 only |
| • Long Operating Time | LAeq 11.00-01.00h | 51dB | 26/11/2015 only |
| • Night | LAeq 23.00-07.00h | 47dB | |

All data above are free-field values. Approximately, the ambient noise levels will be 5dB(A) higher at the front of the premises and 3dB(A) higher at Receiver 2 as indicated in Appendix D2. These differences take account of screening and proximity to the roads.

BS4142:2014 Assessment

The calculations and details of the BS4142 assessment are contained in Appendix D

These include the schedules of equipment (Appendix D5) and the calculations of noise emissions (Appendix D6-D10).

Further mitigation requirements have been considered (Appendix D9)

There is no existing equipment on the application site suitable for comparison and insufficient details were provided in the original planning application.

It must be noted all of the proposed equipment is contained in specific locations as indicated on the submitted Oakhills Air Conditioning drawings.

Noise Sensitive Receivers

The noise-sensitive receivers (NSR) are indicated in Appendix D2 as Receiver 1 and 2.

These are residential premises.

All calculations are to 1m from the presumed habitable room window and façade reflections have been included for both noise emissions and background sound level.

Equipment

The mechanical equipment is not limited to a kitchen extract fan.

The range of equipment and locations are indicated in the schedule and on the Oakhills drawings.

For fan noise emissions, the internal location ensures the noise emissions are limited to noise to atmosphere from the external duct openings and breakout from any external ductwork.

Position and orientation of the duct openings is determined to optimise the attenuation as well as the dispersion of fumes and odours.

All equipment will operate during the opening times, whether a short (application hours) or long (prior permission) period is considered.

Only the catering condensers for the chiller and freezer refrigeration will operate during the night.



The location of all condensers is critical to the outcome in terms of sound level at the receivers.

The condenser units indicated as CU01 and CU02 shall be located at “low” level at least 0.5m below the flat roof level.

Preferably, condenser unit CU03 should also be located at low level, but a higher position at least 0.1m below the flat roof level is included in calculation.

The kitchen supply and extract fan shall be positioned and oriented as indicated in the drawings. Additional allowance should be made for acoustic lagging and secondary silencers if the attenuation requirements demand it.

General Assessment

A general comparison between equipment sound level and background sound level has been made (Appendix D10).

The results indicate that at Receiver 1 (above the application site) the noise emissions are likely to be markedly higher than required. Further mitigation may be needed.

At Receiver 2 (north-west), the noise emissions are much less, but are still unlikely to meet the 10dB(A) below background target. Mitigation may be required.

Appendix D11 and D12 indicate the scale and type of mitigation that may be needed.

BS4142 Assessments

Appendix D13 sets out the BS4142 assessment of mechanical equipment during the proposed “short operating time” of 11.00-23.30h.

No attenuation is included other than the standard silencers and indicated ductwork. Condenser positions are as stated above.

The Receiver 2 results show the Reading BC criterion is achievable without further mitigation.

The Receiver 1 results show a low difference of Rating Level Difference of -4dB – that is 4dB below background. Such a difference remains a low risk of complaints, but this is determined by the kitchen extract and supply fan.

Further mitigation has been recommended. If mitigation equivalent to that in Appendix D11 were used a Rating Sound Level of 33dB(A) would result and a level difference some 13dB(A) below background sound level apply. These would achieve the Reading BC guidance target.

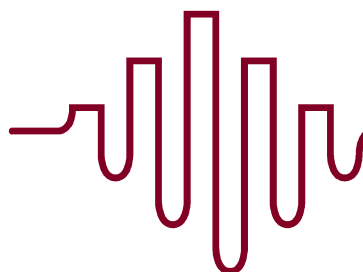
A reduced standard of attenuation would be applied if the short operating times were included in any future planning permission.

Appendix D13 sets out the BS4142 assessment of mechanical equipment during the proposed “long operating time” of 11.00-01.00h.

Further noise mitigation is required and is included in the assessment. With this in place, the Reading BC target can be achieved at both receivers.

Appendix D13 sets out the BS4142 assessment of mechanical equipment during the proposed “short operating time” of 11.00-23.30h.

Only two condensers operate at duty during the night (i.e. closed period).



These are able to achieve the Reading BC target at both receivers, based on the installed positions.

Impact Assessment

The proposed equipment is assessed to be a “negligible” risk of adverse noise impact as stated in Appendix D with the inclusion of secondary kitchen ventilation silencers and acoustic lagging.

Without these a “low” / “minor” risk of adverse impact applies at Receiver 1.

The context of the area is one exposed to other building services equipment, some of which is clearly audible, and to road traffic noise.

In this context, such an assessment of the proposed equipment is expected to be reasonable and acceptable, acoustically. Residential amenity would remain protected by the low noise levels inside – even with open windows – and a termination hour shortly after 23.00 hours (23.30 hours).

Within the context of identified residential premises and the prevailing noise climate, the proposed equipment is expected to have an acceptable and reasonable impact on residents or residential amenity.

Similarly, the equipment will not exacerbate the current situation.

Additional attenuation is required and has been indicated for kitchen ventilation equipment and this will be included if longer operating times are attained.

Some additional attenuation may be advisable for the fans operating up to 23.30 hours, but this may not be of the same extent as late night operation.

Terminating the fan at or before 23.00 hours will eliminate a need for additional attenuation, based on the data and calculations determined at this stage.

NB: current air conditioning units located at the application site (three condenser fans) will be removed. The current noise climate will be improved markedly based on the measured and heard conditions.

Planning Assessment

The proposed building services equipment is expected to operate within the scope of Reading BC planning control requirements.

Daytime residential amenity is protected by provision of selected mechanical equipment and attenuation equipment.

Operating up to 23.30 hours residential amenity is protected to a reasonable and acceptable standard and with low risk of adverse impact or disturbance, by provision of same equipment.

Some additional attenuation may be deemed appropriate for management of risk and providing future flexibility, but is not acoustically necessary, based on current information.

Residential amenity, if equipment operates up to 01.00 hours, will be protected when the indicated range of noise control measures is included.



Residential amenity will be protected outside opening hours by limiting the equipment operating and ensuring the optimum selection and position of catering condenser units is maintained.

No change in overall ambient noise level would be expected to occur, under normal operation. The risk of adverse impact is assessed to be minor to negligible for the proposed equipment.

Equipment Noise Data

It should be noted equipment noise data is detailed in Appendix D5.

Noise Vibration Control

Vibration isolation of the fans, ducts and duct riser is required and included to achieve:-

- Flexible connections between fan and ductwork (all acoustically lagged)
- Anti-vibration mountings to fan and ductwork throughout system length static deflection 5mm to fan 3-5mm to ductwork to achieve 95% isolation or more
- Anti-vibration mountings to condensers of static deflection 5mm on frame supports to achieve 95% isolation or more
- All other mechanical equipment (including evaporators and pumps) to be incorporated
- Final selection of mountings to include detailed review of final internal location, mounting methods of system and design specification of performance

Noise control of the fans, ducts and duct riser is required and included to achieve:-

- Proprietary primary attenuators fitted to or near fans internally
- Proprietary secondary attenuator to fan SF02.
- Generic secondary attenuator to fan SF01 and EF01 separated from bends, transitions, branches or other duct elements by at least two major duct dimensions
 - Similar to Conabeare 1500mm duct-mounted rectangular attenuator in vertical orientation
- Mass-layer acoustic lagging to all ductwork from roof penetration up to and including silencer to achieve 8.5 kg/m^2 minimum surface mass and be mounted on mineral fibre layer 75mm thick of $35\text{-}45 \text{ kg/m}^3$ density
- Acoustic lagging mass layer to be formed of two layers of polymeric sound barrier mat lapped, staggered and sealed (thickness not exceeding 10mm)
- Acoustic lagging to roof junction also, allowing for casing ventilation if required
- Acoustic lagging to apply from roof penetration up to and including any attenuator
- Final selection of noise control measures to include detailed review of final location, duct layout of system and design specification of performance



Vibration Isolation

All mechanical equipment will incorporate vibration isolation equipment to ensure transmitted vibration and structure-borne noise is commensurate with residential neighbours.

Vehicle Noise

Appendix E1 provides a summarised assessment of vehicle noise.

The delivery method is by electric scooters. These are subjectively quiet and spend little time near the branch.

Measurements of these scooters indicate an exceptionally low noise level in comparison to current conditions.

Servicing vehicles will be limited, but even assuming one large goods vehicle unloading in any one night per week, the night-time ambient sound level would not be increased.

In comparison to the current noise climate, the servicing is not expected to have an adverse impact.

It should be noted that night-time deliveries are not the preferred option and delivery options will be determined according to need and the proposed operating hours.

Customer vehicles will be indistinguishable from the current conditions, which have been observed. Numerous cars and vans used the apron and parking in front of the parade of shops during site visits. Trips were regular, even late at night. Cars on the road continued throughout the attended period at higher speeds and with the added effect of traffic management noise at the nearby junction.

Customer vehicles are not expected to have an adverse impact on current conditions.

Conclusions

Aulos Acoustics has completed an investigation of the environmental noise exposure expected of the application site at Pizza Express Delivered branch at 256 Shinfield Road Reading RG2 8EY.

An environmental noise survey has been completed.

The proposed equipment will meet the requirements of the Reading Borough Council for protection of residential amenity with the proposed standard of attenuation and during the proposed operating times.

With the standard noise control scheme the advised target sound level of Reading BC cannot be achieved at the nearest flat up to 23.30 hours. The internal noise levels with windows open will remain low and insufficient to disturb sleep or rest at night. BS4142 still indicates a “low” risk of adverse impact would prevail.

For later opening hours (up to 01.00 hours) a secondary noise control package would be included. With the package in place, the Reading BC criterion would be achievable, based on current selections and data. A negligible impact would be expected on the nearest residents.



Night-time operation is limited to catering condensers which are selected and positioned to optimise noise conditions. The Reading BC criterion would be achievable. A negligible impact would be expected on the nearest residents.

Vehicle noise is not expected to have an adverse impact on residential amenity or be distinguishable from current conditions. Scooter noise, particularly, is extremely quiet and is a major mitigation measure as these electrical vehicles are markedly quieter than any combustion vehicles. Servicing vehicles are not expected to increase even night-time noise levels and customer cars are likely to be indistinguishable from current conditions.

The proposed use in this location meets the requirements of the National Planning Policy Framework, Planning Practice Guidance - Noise and Noise Policy Statement for England. Significant adverse effects are avoided and the resultant noise level would not be expected to adversely affect residents.

The proposed development is expected to meet the requirements of the Reading Borough Council for protection of residential amenity and is not expected to impact adversely on the local residents.

James Tomalin MIOA



Appendix A- Glossary

Term	Description
Sound	Physical oscillation of air or other material which is normally detected by the ear as a complex, time-varying and detailed description of the environment around the listener. Interpretation and subjective filtering of sound by the brain results in comprehension, emotional response and physical reactions to sound. Sound can also be detected by touch when transmitted in a solid medium and be perceived as motion at very low frequencies (i.e. vibration).
Noise	Generally defined as unwanted sound, which as a highly subjective description is subject to wide interpretation. Some describe noise as harsh or dissonant conditions, but such descriptions tend to be value-based and will vary from person to person.
Ambient Noise	The noise climate heard over a period of time due to all normal sources, in the absence of extraneous or atypical sounds. Used to describe noise in the absence of the introduced sound, generally.
Ambient Noise Level	Describes the average noise level of the ambient noise over a stated period of time, e.g. hourly noise
	Parameter: A-weighted Continuous Equivalent Sound Pressure Level determined over the period T. $L_{eq,T}$ or $L_{Aeq,T}$ dB(A) or dB Expressed in decibels / A-weighted decibels
Note:	Used in the reports generically to represent both current noise climate and noise level of vehicle noise to encourage direct comparison
$L_{eq,T}$	the notionally-steady sound level having the same acoustic energy as the time varying sound pressure level over the same period
Background Noise	The underlying noise climate in the absence of an introduced or extraneous noise. Describes the quieter periods in the noise climate.
Background Noise Level	Describes the “average minimum” level of the background noise climate over a stated period of time Parameter: A-weighted Statistical Index 90% Sound Pressure. The quietest decile of the sound pressure levels or level exceeded for 90% of the time period, T $L_{90,T}$ or $L_{A90,T}$ dB(A) or dB Expressed in decibels / A-weighted decibels
Acoustic screening	Physical barrier to sound formed by fence, wall, building or other structure, which has the effect of reducing the sound transmitted.
Individual Event Noise	The noise of a distinctive event with the varying noise climate, usually a transient activity, such as a vehicle pass-by, aircraft flyover or similar, rather than an isolated impulsive noise.
Event Noise Level	Highest noise level during the event as measured under particular conditions of time-weighting Parameter: A-weighted Maximum Sound Pressure Level with FAST or SLOW time weighting $L_{Amax,FAST}$ or $L_{Amax,F}$ $L_{Amax,SLOW}$ or $L_{Amax,S}$ dB(A) or dB Expressed in decibels / A-weighted decibels
Event Frequency	The number of times an individual event of a similar type occurs in the time period under consideration. Important descriptor as the impact of Individual Event Noise is dependent on changes in both level and event frequency.
Time Weighting	The sampling rate at which a sound level meter measures the time-varying sound pressure level: originally described how fast the needle moved on analogue meters. Ensures the measurements respond to the type of noise source accurately and are representative. FAST = 125ms sampling rate = 480 samples / minute SLOW = 1s sampling rate = 60 samples / minute



Appendix B - References

1. **BSI.** *BS4142:2014 'Methods for rating and assessing industrial and commercial sound'*. EH/1, BSI. London : BSI, 2014. p. 80, Standard. ISBN 978 0 580 80051 1.
2. **HM Government.** *National Planning Policy Framework*. DCLG, HM Government. London : HM Government, 2012. p. 65, Policy. ISBN 9781409834137.
3. —. *Noise Policy Statement for England (NPSE)*. London : DeFRA, 2010. p. 10, Policy. NPSE2010.
4. —. *Planning Practice Guidance – Noise ID30*. DCLG. London : HM Government, 2014. Guidance. Active guidance.
5. **BSI.** *BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures*. London : BSI, 2003. Standard. BS 7445-1:2003.
6. —. *BS 7445-2:1991, ISO 1996-2:1987 Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use*. London : BSI, 1991. Standard. Current UK standard. EN ISO standard is updated. BS 7445-2:1991.
7. —. *BS 7445-3:1991, ISO 1996-3:1987 Description and measurement of environmental noise. Guide to application to noise limits*. London : BSI, 2003. Standard. ISO edition already updated.
8. —. *BS 8233:2014 Guidance on sound insulation and noise reduction for buildings*. London : BSI, 2014. Standard.
9. —. *BS 4142:1997 Method for Rating Industrial Noise in Mixed Residential and industrial Areas*. EH/1/3, BSI. London : HMSO, 1997. p. 20, Standard. ISBN 0 580 28300 3.



Appendix C Local Planning

Sites And Detailed Policies Document

Adopted October 2012 (Revised January 2015)

DM4: SAFEGUARDING AMENITY

Development will not cause a significant detrimental impact to the living environment of existing or new residential properties, in terms of:

- Privacy and overlooking;
- Access to sunlight and daylight;
- Visual dominance and overbearing effects of a development;
- Noise and disturbance;
- Artificial lighting;
- Vibration;
- Dust and fumes;
- Smell; or
- Crime and safety.

The position of habitable rooms, windows and outdoor living spaces will be particularly important. A back-to-back distance of 20 metres between dwellings is usually appropriate, although the circumstances on individual sites may enable dwellings to be closer without a detrimental effect on privacy. As well as immediate impacts, other aspects to which this policy applies will include matters such as hours of operation of businesses, and effects of traffic movements, particularly of heavy goods vehicles (HGVs). Proposals which would generate regular movements of HGVs on residential roads will not be acceptable. Where an otherwise acceptable development could change its character to a use that would have a greater impact on amenity without needing planning permission, conditions will be applied to restrict such changes.



Appendix D BS4142:2014 Investigations & Assessments

Appendix E Vehicle Noise Assessment

Calculation Reference	Revision	Title & Revision Comment	Checked	Approved	Date
15P916 JT C2010-417	D1-D14	Mechanical Equipment BS4142	JT	JT	03/12/15
	E1	Vehicle Noise	JT	JT	03/12/15



Author

Consultant	James Tomalin	Director	Date	27/11/2015
Qualifications	MIOA			
Experience	Building acoustics; building services acoustics; environmental acoustics			
Length	26 years			
Profile	Linked in profile			

Location

	Pizza Express Delivered	256 Shinfield Road Reading RG2 8EY
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Equipment

	Norsonic 118	31778	ID 7255185	Calib due	#####
	GRAS 41ALS	49742		Calib due	#####

Tests

Standard(s)	BS4142:2014	BS7445 parts as per UK
Source Type(s)	Mechanical equipment Environmental noise	
Measurement	Continuous	15 minute samples 30s resolution Fast Slow

Sources

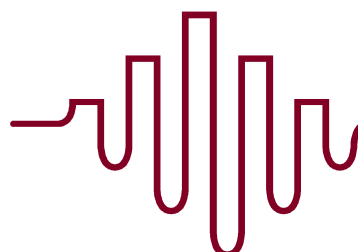
	HVAC Noise	Major source but intermittent	Condenser units primarily
	Road traffic	Minor source	
	Commercial	Some other units generating noise	

Weather

Temperature	9-13C
Wind Speed	N/A
Direction	N/A
Gusts	N/A
RH%	0.85
Precipitation	Minor <1mm; intermittent drizzle
Cloud cover	Full

Survey

Start	26/11/2015 20:45
Finish	27/11/2015 09:45
Type	Continuous automated
Comment	Site visit completed and confirmed environment character





Residential or possible resi.

Public building

Receiver 2

Position 1

Receiver 1

Flat roof approx 4.5m above ground level

Equipment noise controlling

Sensitive Receivers

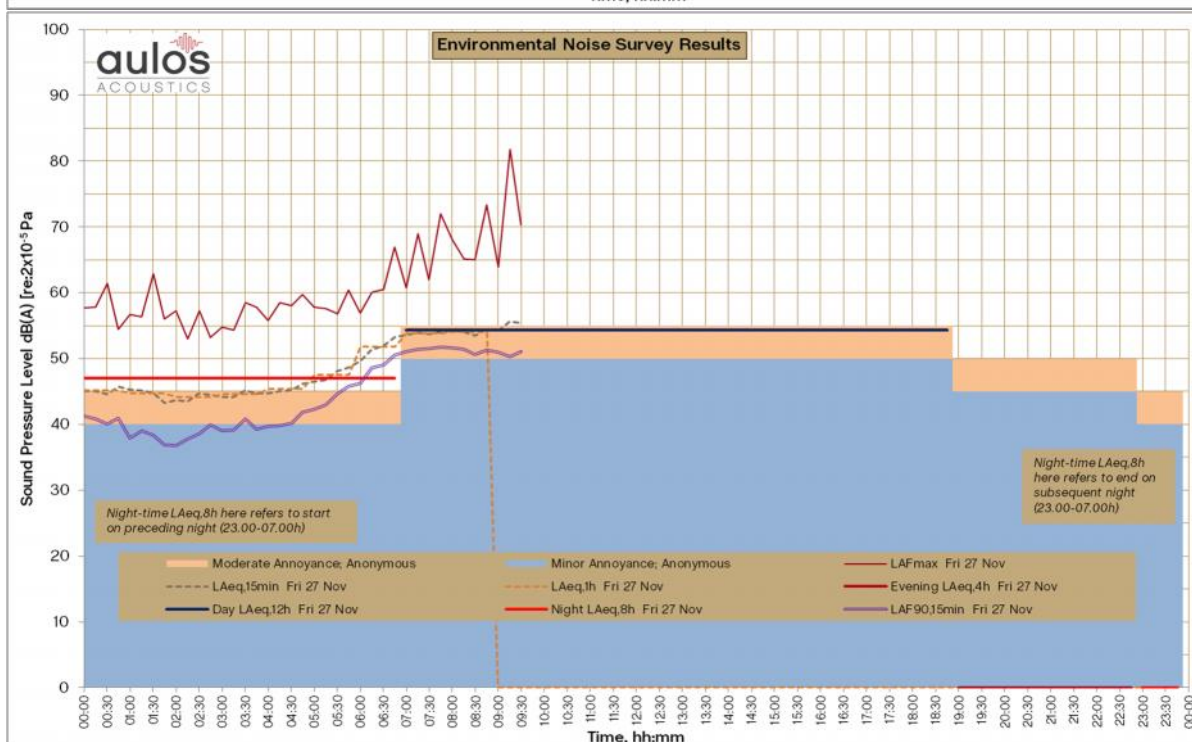
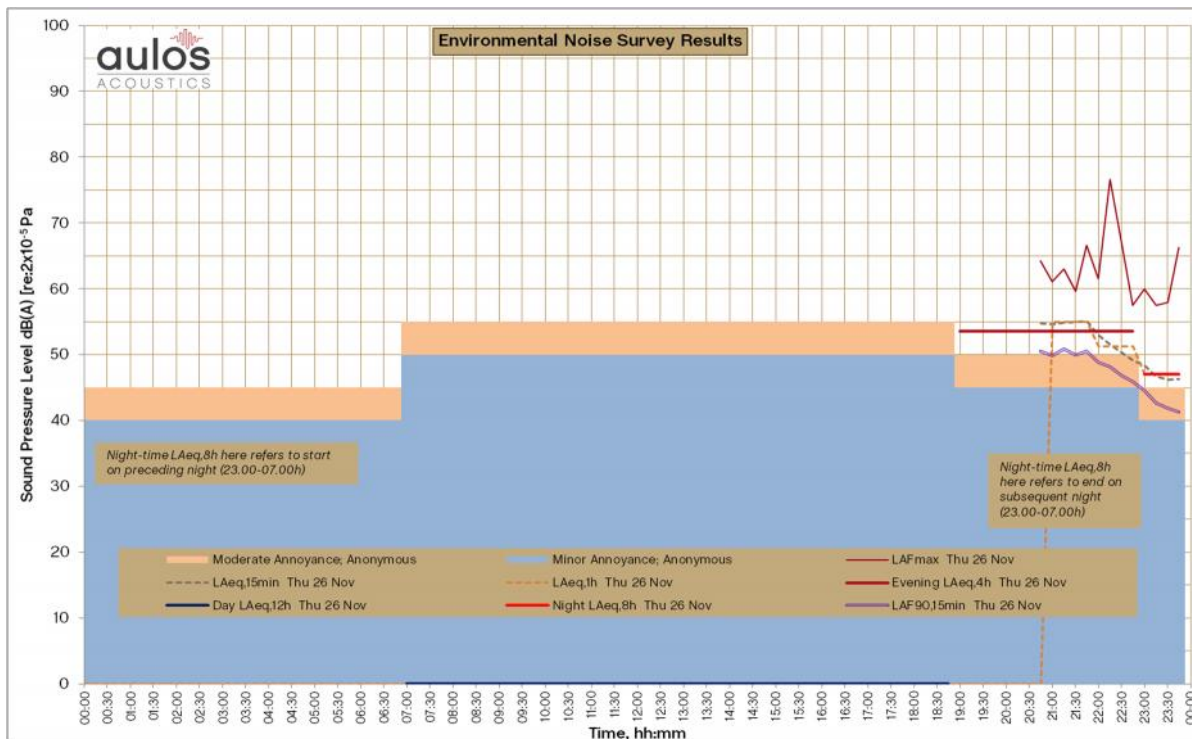
Specific receivers identifiable. All overlook flat roof where main equipment ducts emerge.

Nearest receivers are in flats over premises.

Houses to north-west have a clear line of sight at increased distance.

Potential residential premises to south does not appear to have habitable rooms facing the mechanical equipment.





Measurement Results

The range of background sound levels are as follows:-

Period	LA90 Lowest		LAeq
	15min	1h	
07.00-19.00	50.3	51.2	
19.00-23.00	45.9	47.6	53.6
23.00-07.00	36.8	38.1	47.1
24h 07-07.00	36.8	38.1	
24h 00-00.00	36.8	42.8	
11.00-01.00	40.0	40.8	51.5
11.00-23.30	42.6		
	dB(A)	dB(A)	dB(A)

Some are partial periods due to survey timing.

Long Operating Time
Short Operating Time

Background Sound Level

The reference Background Sound Level, L_{Ab}

Daytime	47.6 dB	1h	free field
Operating Period	40.0 dB	15 min	free field
Night	36.8 dB	15 min	free field



New Equipment Schedule

Ref	Location	Description	Main Time	Control	On	Type
EF01	Inside	Kitchen Extract	11:00	01:00	Time	100% Systemair MUB/T 042 500D4-IE2
SF01	Inside	Kitchen Supply	11:00	01:00	Time	100% Systemair MUB/T 042 400EC-A2
CU01	Outside	Condenser	07:00	07:00	Time	65% Toshiba RAV SM564AT
CU02	Outside	Condenser Freezer	07:00	07:00	Time	65% Danfoss unit LPHM026
EV02	Inside	Evaporator	07:00	07:00	Time	65% GEC Searle evap TEC4-5
CU03	Outside	Condenser Freezer	07:00	07:00	Time	65% Danfoss unit MPHM010
EV03	Inside	Evaporator	07:00	07:00	Time	65% GEC Searle evap TEC3-5.7
SF02	Inside	General Extract	11:00	01:00	Time	100%

* reference is Aulos Acoustics reference to enable continuity in calculations

Location Is the location of noise emission for intake, discharge or outdoor unit location

Main Time The primary operating times. Units are remotely switched off by a management system or occupant controlled.

New Equipment Noise Schedule

Ref		Level [dB re 2x10 ⁻⁶ Pa] @Octave Band Mid Frequency [Hz]								
		dB(A)	63	125	250	500	1k	2k	4k	8k
EF01	Fan Lw	75.3	88	80	77	73	69	65	60	55
SF01	Fan Lw	72.7	80	81	72	71	64	64	59	51
CU01	Unit Lw	64.6	69	69	65	61	61	54	47	42
CU02	Unit Lw	67	71.4	71.4	67.4	63.4	63.4	56.4	49.4	44.4
EV02										
CU03	Unit Lw	60	64.4	64.4	60.4	56.4	56.4	49.4	42.4	37.4
EV03										
SF02	Fan Lw	72.1	70	81	76	67	65	62	55	51

Calculate EF01 In-duct sound level

EF01	Fan Lw	75.3	88	80	77	73	69	65	60	55
Bend	500		0	0	-1	-2	-3	-3	-3	-3
Bend	500		0	0	-1	-2	-3	-3	-3	-3
Filters	Nil		0	0	0	0	0	0	0	0
Duct	Nil		0	0	0	0	0	0	0	0
EF01	Induct lw	72	88	80	75	69	63	59	54	49
Silencer	LDK55		-7	-9	-9	-13	-12	-9	-8	-6
EF01	Induct lw	62	81	71	66	56	51	50	46	43

Calculate SF01 In-duct sound level

SF01	Fan Lw	72.7	80	81	72	71	64	64	59	51
Bend	500		0	0	-1	-2	-3	-3	-3	-3
Duct	Nil		0	0	0	0	0	0	0	0
SF01	Induct lw	71	80	81	71	69	61	61	56	48
Silencer	LDK55		-7	-9	-9	-13	-12	-9	-8	-6
SF01	Induct lw	61	73	72	62	56	49	52	48	42



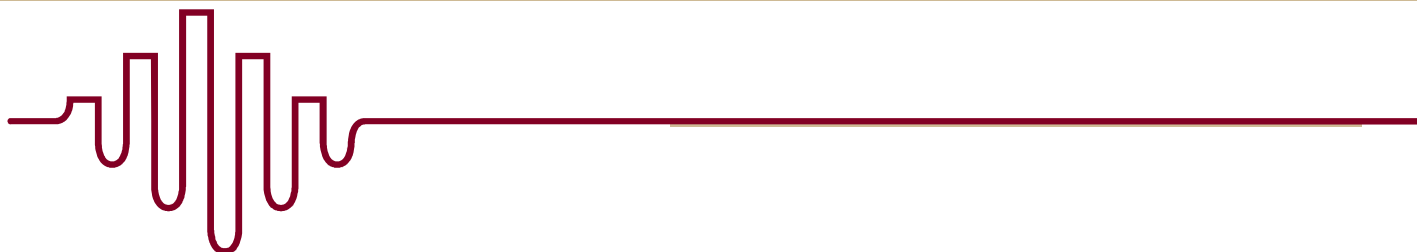
			Level [dB re 2x10 ⁻⁶ Pa] @Octave Band Mid Frequency [Hz]							
			dB(A)	63	125	250	500 1k	2k	4k	8k
CU01			64.6	69	69	65	61	61	54	47
Distance	r, m	10.4		-20.3	-20.3	-20.3	-20.3	-20.3	-20.3	-20.3
Divergence Q=		4		-5	-5	-5	-5	-5	-5	-5
DI				-3	-3	-3	-3	-3	-3	-3
On Time		65%		-1.87	-1.87	-1.87	-1.87	-1.87	-1.87	-1.87
Screen	Roof edge 0.5m below			-8	-11	-13	-15	-15	-15	-15
Lp	Window	Including façade effect	25	36	33	27	21	21	14	7
CU02			67	71.4	71.4	67.4	63.4	63.4	56.4	49.4
Distance	r, m	10.4		-20.3	-20.3	-20.3	-20.3	-20.3	-20.3	-20.3
Divergence Q=		4		-5	-5	-5	-5	-5	-5	-5
DI				-3	-3	-3	-3	-3	-3	-3
On Time		65%		-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9
Screen	Roof edge 0.5m below			-8	-11	-13	-15	-15	-15	-15
Lp	Window	Including façade effect	28	38	35	29	23	23	16	9
CU03			60	64.4	64.4	60.4	56.4	56.4	49.4	42.4
Distance	r, m	10.4		-20.3	-20.3	-20.3	-20.3	-20.3	-20.3	-20.3
Divergence Q=		4		-5	-5	-5	-5	-5	-5	-5
DI				-3	-3	-3	-3	-3	-3	-3
On Time		65%		-1.87	-1.87	-1.87	-1.87	-1.87	-1.87	-1.87
Screen	Roof edge 0.1m below			-5	-6	-7	-8	-10	-10	-10
Lp	Window	Including façade effect	26	34	33	28	23	21	14	7
SF02			72.1	70	81	76	67	65	62	55
Bend				0	0	0	-1	-2	-3	-3
Silencer	LDC 250-900			-3	-4	-8	-20	-26	-23	-10
End Reflection				-9	-5	-2	0	0	0	0
Distance	r, m	10.4		-20.3	-20.3	-20.3	-20.3	-20.3	-20.3	-20.3
Divergence Q=		2		-8	-8	-8	-8	-8	-8	-8
DI				0	0	0	0	0	0	0
On Time		100%		0	0	0	0	0	0	0
Screen	Roof edge 0.1m below			-5	-6	-7	-8	-10	-10	-10
Lp	Window	Including façade effect	27	27	40	33	12	1	0	6
Daytime										
All Condensers+SF02										
Lp	Window	Including façade effect	33	15	26	27	24	27	21	15
Night-time only										
CU02+CU03										
Lp	Window	Including façade effect	30	14	21	23	23	25	19	12



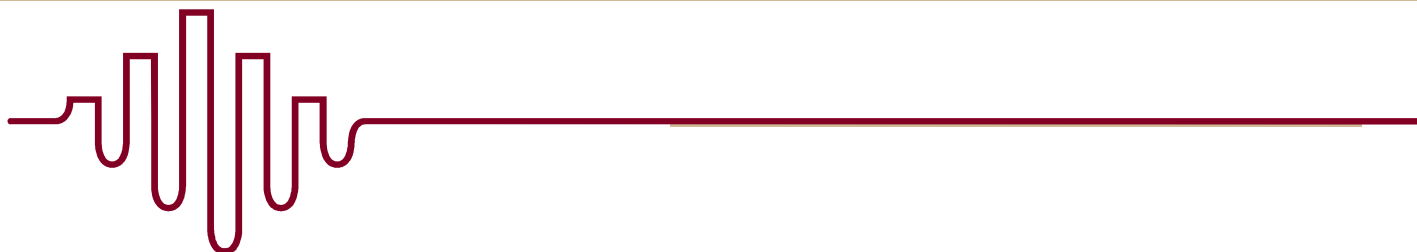
			Level [dB re 2x10 ⁻⁶ Pa] @Octave Band Mid Frequency [Hz]							
			dB(A)	63	125	250	500 1k	2k	4k	8k
			dB							
CU01			64.6	69	69	65	61	61	54	47
Distance	r, m	17		-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6
Divergence Q=		2		-8	-8	-8	-8	-8	-8	-8
DI				-3	-3	-3	-3	-3	-3	-3
On Time		65%		-1.87	-1.87	-1.87	-1.87	-1.87	-1.87	-1.87
Screen	Low level boundary			-5	-6	-7	-8	-10	-10	-10
Lp	Window	Including façade effect	24	32	31	26	21	19	12	5
CU02			67	71.4	71.4	67.4	63.4	63.4	56.4	49.4
Distance	r, m	17		-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6
Divergence Q=		2		-8	-8	-8	-8	-8	-8	-8
DI				-3	-3	-3	-3	-3	-3	-3
On Time		65%		-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9
Screen	Low level boundary			-5	-6	-7	-8	-10	-10	-10
Lp	Window	Including façade effect	26	34	33	28	23	21	14	7
CU03			60	64.4	64.4	60.4	56.4	56.4	49.4	42.4
Distance	r, m	17		-24.6	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6
Divergence Q=		2		-8	-8	-8	-8	-8	-8	-8
DI				3	3	3	3	3	3	3
On Time		65%		-1.87	-1.87	-1.87	-1.87	-1.87	-1.87	-1.87
Screen	Fence grazing			-5	-5	-5	-5	-5	-5	-5
Lp	Window	Including façade effect	29	33	33	29	25	25	18	11
SF02			72.1	70	81	76	67	65	62	55
Bend				0	0	0	-1	-2	-3	-3
Silencer	LDC 250-900			-3	-4	-8	-20	-26	-23	-10
End Reflection				-9	-5	-2	0	0	0	0
Distance	r, m	19		-25.6	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6
Divergence Q=		2		-8	-8	-8	-8	-8	-8	-8
DI				2	3	4	5	6	6	6
On Time		100%		0	0	0	0	0	0	0
Screen	Building			-5	-6	-7	-8	-10	-10	-10
Lp	Window	Including façade effect	26	24	38	32	12	2	1	7
Daytime										
All Condensers										
Lp	Window	Including façade effect	32	12	25	26	25	27	21	15
Night-time only										
CU02+CU03										
Lp	Window	Including façade effect	32	11	24	26	24	26	20	14



			Level [dB re 2x10-6 Pa] @Octave Band Mid Frequency [Hz]								
			dB(A)	63	125	250	500 1k	2k	4k	8k	dB
In duct Lw		EF01 Breakout	62	81	71	66	56	51	50	46	43
R	dB	500 rolled circular		-23	-24	-25	-28	-30	-30	-30	-30
A	m²	0.785398163									
S	m²	9.424777961		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Breakout Lw		3dB below in duct Lw worst case	68.8	57.8	51.8	38.8	31.8	30.8	26.8	23.8	
Distance	r, m	3		-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5	-20.5
Reflection	Q=	2		3	3	3	3	3	3	3	3
On Time		100%		0	0	0	0	0	0	0	0
Lp	Window	Including façade effect	33	54	43	37	24	17	16	12	9
In duct Lw		SF01 Breakout	61	73	72	62	56	49	52	48	42
R	dB	18g rectangular		-16	-18	-19	-23	-25	-25	-22	-19
A	m²	0.18									
S	m²	3.6		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Breakout Lw		3dB below in duct Lw worst case	68	64.8	53.8	43.8	34.8	37.8	36.8	33.8	
Distance	r, m	4.5		-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1
Divergence	Q=	2		-8	-8	-8	-8	-8	-8	-8	-8
On Time		100%		0	0	0	0	0	0	0	0
Lp	Window	Including façade effect	33	49	46	35	25	16	19	18	15
In duct Lw		EF01 to Atmosphere	62	81	71	66	56	51	50	46	43
End Reflect	dB	500mm		-9	-5	-2	0	0	0	0	0
Radiated Lw				72	66	64	56	51	50	46	43
Distance	r, m	5		-14	-14	-14	-14	-14	-14	-14	-14
Reflection	Q=	1		-11	-11	-11	-11	-11	-11	-11	-11
DI				2	1.5	0	-4	-11	-10.5	-10.5	-10.5
On Time		100%		0	0	0	0	0	0	0	0
Lp	Window	Including façade effect	35	52	45	42	30	18	17	13	10
In duct Lw		SF01 to Atmosphere	61	73	72	62	56	49	52	48	42
End Reflect	dB	0.18m²		-9	-5	-2	0	0	0	0	0
Radiated Lw				64	67	60	56	49	52	48	42
Distance	r, m	5		-14	-14	-14	-14	-14	-14	-14	-14
Reflection	Q=	2		-8	-8	-8	-8	-8	-8	-8	-8
DI				2	1.5	0	-4	-11	-10.5	-10.5	-10.5
On Time		100%		0	0	0	0	0	0	0	0
Lp	Window	Including façade effect	37	47	49	41	33	19	22	18	12
Daytime											
Lp	Window	Including façade effect	41	31	36	36	32	23	26	23	17



			Level [dB re 2x10-6 Pa] @Octave Band Mid Frequency [Hz]								
			dB(A)	63	125	250	500 1k	2k	4k	8k	dB
In duct Lw		EF01 Breakout	62	81	71	66	56	51	50	46	43
R	dB	500 rolled circular		-23	-24	-25	-28	-30	-30	-30	-30
A	m²	0.785398163									
S	m²	9.424777961		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Breakout Lw		3dB below in duct Lw worst case	68.8	57.8	51.8	38.8	31.8	30.8	26.8	23.8	
Distance	r, m	26		-39.3	-39.3	-39.3	-39.3	-39.3	-39.3	-39.3	-39.3
Reflection	Q=	2		3	3	3	3	3	3	3	3
On Time		100%		0	0	0	0	0	0	0	0
Lp	Window	Including façade effect	14	35	24	18	5	-2	-3	-7	-10
In duct Lw		SF01 Breakout	61	73	72	62	56	49	52	48	42
R	dB	18g rectangular		-16	-18	-19	-23	-25	-25	-22	-19
A	m²	0.18									
S	m²	3.6		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Breakout Lw		3dB below in duct Lw worst case	68	64.8	53.8	43.8	34.8	37.8	36.8	33.8	
Distance	r, m	21		-26.4	-26.4	-26.4	-26.4	-26.4	-26.4	-26.4	-26.4
Divergence	Q=	2		-8	-8	-8	-8	-8	-8	-8	-8
On Time		100%		0	0	0	0	0	0	0	0
Lp	Window	Including façade effect	20	36	33	22	12	3	6	5	2
In duct Lw		EF01 to Atmosphere	62	81	71	66	56	51	50	46	43
End Reflect	dB	500mm		-9	-5	-2	0	0	0	0	0
Radiated Lw				72	66	64	56	51	50	46	43
Distance	r, m	26		-28.3	-28.3	-28.3	-28.3	-28.3	-28.3	-28.3	-28.3
Reflection	Q=	1		-11	-11	-11	-11	-11	-11	-11	-11
DI				3	3	2.5	-1	-8	-10.5	-10.5	-10.5
On Time		100%		0	0	0	0	0	0	0	0
Lp	Window	Including façade effect	23	38	32	30	18	6	3	-1	-4
In duct Lw		SF01 to Atmosphere	61	73	72	62	56	49	52	48	42
End Reflect	dB	0.18m²		-9	-5	-2	0	0	0	0	0
Radiated Lw				64	67	60	56	49	52	48	42
Distance	r, m	26		-28.3	-28.3	-28.3	-28.3	-28.3	-28.3	-28.3	-28.3
Reflection	Q=	2		-8	-8	-8	-8	-8	-8	-8	-8
DI				3	4	5	5	6	7	8	8
On Time		100%		0	0	0	0	0	0	0	0
Lp	Window	Including façade effect	31	33	37	31	27	21	25	22	16
Daytime											
Lp	Window	Including façade effect	32	16	24	25	25	21	26	23	15



Summary to NSR1

			Level [dB re 2x10 ⁻⁶ Pa] @Octave Band Mid Frequency [Hz]							
			dB(A)	63	125	250	500 1k	2k	4k	8k
Daytime										
All Condensers+All Fans										
Lp	Window	Including façade effect	42	31	37	37	33	28	27	24
Night-time only										
CU02+CU03										
Lp	Window	Including façade effect	30	14	21	23	23	25	19	12

Summary to NSR2

			Level [dB re 2x10 ⁻⁶ Pa] @Octave Band Mid Frequency [Hz]							
			dB(A)	63	125	250	500 1k	2k	4k	8k
Daytime										
All Condensers+All Fans										
Lp	Window	Including façade effect	35	17	27	29	28	28	27	24
Night-time only										
CU02+CU03										
Lp	Window	Including façade effect	32	11	24	26	24	26	20	14

Background Comparison

			Difference	
NSR1				
Day	46		-4	Too high
Operating	40		2	Too high
Night	37		-7	Too high
NSR2				
Day	49	allowance for proximity to road	-14	Probably satisfac
Operating	43	allowance for proximity to road	-8	Too high
Night	40	allowance for proximity to road	-8	Too high

Further noise control required.

Allowance must be made for BS4142 rating



Summary to NSR1

	Level [dB re 2x10 ⁻⁶ Pa] @Octave Band Mid Frequency [Hz]								
	dB(A)	63	125	250	500 1k	2k	4k	8k	dB
EF01 Breakout	33	54	43	37	24	17	16	12	9
SF01 Breakout	33	49	46	35	25	16	19	18	15
EF01 to Atmosphere	35	52	45	42	30	18	17	13	10
SF01 to Atmosphere	37	47	49	41	33	19	22	18	12
CU01	25	36	33	27	21	21	14	7	2
CU02	28	38	35	29	23	23	16	9	4
CU03	26	34	33	28	23	21	14	7	2
SF02	27	27	40	33	12	1	0	6	4

Breakout Attenuation - Additional

Mass layer: Polymeric SBM on MF quilt	δR	5	5	6	7	7	6	5	5
Length correction due to silencer location		3	3	3	3	3	3	3	3
EF01 Breakout	24.3	46	35	28	14	7	7	4	1
SF01 Breakout	24.9	41	38	26	15	6	10	10	7

Atmosphere Attenuation - Additional

Secondary silencer to both main fans									
Conabear 1500L 700*700	IL	7	10	14	20	20	17	11	10
EF01 to Atmosphere	23.6	45	35	28	10	-2	0	2	0
SF01 to Atmosphere	24.8	40	39	27	13	-1	5	7	2
Secondary silencer to SF02									
LDC 250-600	IL	3	2	7	13	17	16	8	6
	23.4	24	38	26	-1	-16	-16	-2	-2

Background Comparison

NSR1	Background	Equipment	Difference	
Day	46	33.2	-13	Too high
Operating	40	33.2	-7	Too high
Night	37	30	-7	Too high
NSR2	See next page			
Day	49 allowance for proximity to road			
Operating	43 allowance for proximity to road			
Night	40 allowance for proximity to road			

Further noise control required.

Allowance must be made for BS4142 rating



Summary to NSR1

	Level [dB re 2x10 ⁻⁶ Pa] @Octave Band Mid Frequency [Hz]								
	dB(A)	63	125	250	500 1k	2k	4k	8k	dB
EF01 Breakout	14	35	24	18	5	-2	-3	-7	-10
SF01 Breakout	20	36	33	22	12	3	6	5	2
EF01 to Atmosphere	23	38	32	30	18	6	3	-1	-4
SF01 to Atmosphere	31	33	37	31	27	21	25	22	16
CU01	24	32	31	26	21	19	12	5	0
CU02	26	34	33	28	23	21	14	7	2
CU03	29	33	33	29	25	25	18	11	6
SF02	26	24	38	32	12	2	1	7	5

Breakout Attenuation

Mass layer: Polymeric SBM on MF quilt	δR	5	5	6	7	7	6	5	5
Length correction due to silencer location		3	3	3	3	3	3	3	3
EF01 Breakout	5.58	27	16	9	-5	-12	-12	-15	-18
SF01 Breakout	11.5	28	25	13	2	-7	-3	-3	-6

Atmosphere Attenuation

Secondary silencer to both main fans									
Conabear 1500L 700*700	IL	7	10	14	20	20	17	11	10
EF01 to Atmosphere	11	31	22	16	-2	-14	-14	-12	-14
SF01 to Atmosphere	17.3	26	27	17	7	1	8	11	6
Secondary silencer to SF02									
LDC 250-600	IL	3	2	7	13	17	16	8	6
	21.5	21	36	25	-1	-15	-15	-1	-1

Background Comparison

NSR2	Background	Equipment	Difference	
Day	46	31.9	-14	Probably OK
Operating	40	31.9	-8	Too high
Night	37	30.4	-7	Too high
NSR1	See previous page			
Day	49 allowance for proximity to road			
Operating	43 allowance for proximity to road			
Night	40 allowance for proximity to road			

Further noise control may be required.

Allowance must be made for BS4142 rating



		dB	Page	Relevant clause	N/`
New Equipment					
Measured ambient sound level		-	4	7.3.2	
Residual sound level LAeq,1h		-	4	7.3.3	
Background sound level LA90,T		46	4	8.3	Façade corrected
Assessment made includes night so reference time interval is 15-minutes				7.2	
Specific sound level		LAeq(T) N/A	4		Calculation before
To	Position	Day	Open	Night	
					m
					dB
					7.3.14
					dB
					7.3.4
Specific sound level corrected					
To	Position	NSR1	NSR2	Unattenuated	
	Ls	dB	42	35	
Acoustic feature	Tonality	dB	0	0	9.3 Not in the context
	Impulsivity	dB	0	0	9.2 None
	Other	dB	0	0	9.2 No distinctiveness
	Intermittency	dB	0	0	9.2 No distinctiveness
	Lr,full	dB	41.5	35.3	
Rating Level	Lr	dB	42	35	9.3.1 Rounded once
Background sound level LA90,T		dB	46	49	Façade corrected
Level Difference		dB	-4	-14	11
7.3.3					
Assessment of impact		NSR1	Minor impact		11
		NSR2	Negligible impact		11

Outcome

Assessment indicates the residential or potential residential receivers are currently subject to a low risk of adverse impact. In normal circumstances and in context, this relates to negligible impact at both assessment positions.

Uncertainty	Overall- minor due to both positive & negative values & large Level Difference
Measurement	Minor - based on measured and published plant noise data and measured background
Calculation	Minor - measured known position of receivers, equipment and orientation
Rating	Minor - low LA90,T is used in assessment and continuous full operation is assumed

Local Planning Outcome

The notional "10dB(A) below background" target cannot be achieved, but a low risk of adverse impact is determined. Mechanical equipment noise will be very low inside flats and not of sufficient level to disturb sleep or rest. Kitchen ventilation equipment is well-controlled but would benefit from additional attenuation.



New Equipment		dB	Page	Relevant clause	N/`
Measured ambient sound level		-	4	7.3.2	
Residual sound level LAeq,1h		-	4	7.3.3	
Background sound level LA90,T		43	4	8.3	Façade corrected
Assessment made includes night so reference time interval is 15-minutes				7.2	
Specific sound level		LAeq(T) N/A	4		Calculation before
To	Position	Day	Open	Night	
					m
					dB
					7.3.14
					dB
					7.3.4
Specific sound level corrected					
To	Position	NSR1	NSR2	Attenuated	
	Ls	dB	33.2	31.9	
Acoustic feature	Tonality	dB	0	0	9.3 Not in the context
	Impulsivity	dB	0	0	9.2 None
	Other	dB	0	0	9.2 No distinctiveness
	Intermittency	dB	0	0	9.2 No distinctiveness
	Lr,full	dB	33.2	31.9	
Rating Level	Lr	dB	33	32	9.3.1 Rounded once
Background sound level LA90,T		dB	43	46	Façade corrected
Level Difference		dB	-10	-14	11
7.3.3					
Assessment of impact		NSR1	Negligible impact		11
		NSR2	Negligible impact		11

Outcome

Assessment indicates the residential or potential residential receivers are currently subject to a low risk of adverse impact. In normal circumstances and in context, this relates to negligible impact at both assessment positions.

Uncertainty	Overall- minor due to both positive & negative values & large Level Difference
Measurement	Minor - based on measured and published plant noise data and measured background
Calculation	Minor - measured known position of receivers, equipment and orientation
Rating	Minor - low LA90,T is used in assessment and continuous full operation is assumed

Local Planning Outcome

The notional "10dB(A) below background" target can be achieved a low risk of adverse impact is determined. Mechanical equipment noise will be very low inside flats and not of sufficient level to disturb sleep or rest. Alone kitchen ventilation equipment is well-controlled and distinctiveness limited once attenuated at 30dB(A) at residential window.



New Equipment		dB	Page	Relevant clause	N/`
Measured ambient sound level		-	4	7.3.2	
Residual sound level LAeq,1h		-	4	7.3.3	
Background sound level LA90,T		40	4	8.3	Façade corrected
Assessment made includes night so reference time interval is 15-minutes				7.2	
Specific sound level		LAeq(T) N/A	4		Calculation before
To	Position	Day	Open	Night	
					m
					dB
					7.3.14
					dB
					7.3.4
Specific sound level corrected					
To	Position	NSR1	NSR2	Attenuated	
	Ls	dB	30.0	30.4	
Acoustic feature	Tonality	dB	0	0	9.3 Not in the context
	Impulsivity	dB	0	0	9.2 None
	Other	dB	0	0	9.2 No distinctiveness
	Intermittency	dB	0	0	9.2 No distinctiveness
	Lr,full	dB	30.0	30.4	
Rating Level	Lr	dB	30	30	9.3.1 Rounded once
Background sound level LA90,T		dB	40	43	Façade corrected
Level Difference		dB	-10	-13	11
7.3.3					
Assessment of impact		NSR1	Negligible impact		11
		NSR2	Negligible impact		11

Outcome

Assessment indicates the residential or potential residential receivers are currently subject to a low risk of adverse impact. In normal circumstances and in context, this relates to negligible impact at both assessment positions.

Uncertainty	Overall- minor due to both positive & negative values & large Level Difference
Measurement	Minor - based on measured and published plant noise data and measured background
Calculation	Minor - measured known position of receivers, equipment and orientation
Rating	Minor - low LA90,T is used in assessment and continuous full operation is assumed

Local Planning Outcome

The notional "10dB(A) below background" target can be achieved a low risk of adverse impact is determined. Mechanical equipment noise will be very low inside flats and not of sufficient level to disturb sleep or rest. There will be no kitchen ventilation equipment, air-conditioning or general extract after opening times at night.



Scooter Noise Emissions

	r, m	dB(A)	
Measured Notional Average	0.4	55	pessimistic as includes full torque of motor and side stand
Passbys Starts Mock up loading and pull away			
Distance to flats	8	29	
Façade		2.5	
Façade Level		31.5	
Number 5 scooters		7	pessimistic as highly unlikely simultaneous
Cumulative Sound Level		38.5	
Minimum Ambient		47	
Difference		-8.5	pessimistic for above reasons and noise is not continuous, but extremely brief Estimated on-time in 15 minute period would be three minutes at the most - an 8dB reduction

The scooters are subjectively quiet and have no distinguishing features

Such a difference is expected to ensure negligible adverse impact

Largely, they would be inaudible and are much quieter than cars and people using the parade of shops currently.

Servicing Noise

On the basis that one large goods vehicle visits site each day (pessimistic) a minimal impact on daytime and evening noise would be expected.

The effect of such a delivery would be significantly diluted over any reasonable reference period, particularly in comparison to current road traffic movements and use of the parade for parking and deliveries, which includes goods vehicles.

No additional effect would be expected during the day and evening.

Night-time movements although not the preferred option would not be expected to elevate ambient noise levels to any significant degree either.

Even on the basis that a goods vehicle generated LAeq,5min 65dB(A) at 5m under parking and unloading the night-time sound level would be only:-

	r,m	LAeq,5min	dB	Time,s	LAeq,T	dB
LAeq,5min	5	65		300		Typical high load
At flat	8	60.9				
Façade		2.5				
Façade Level		63.4	#####		43.6	Night

Typical ambient noise level at rear is 47dB(A) at night and expected to be at least 52dB(A) at front at night - 55dB(A) at façade

A goods vehicle delivery would not increase the expected night-time noise level.

Cars

Current use of the apron and parking spaces along the parade is extensive. During both site visits car movements were noted on a regular basis. These were quiet in comparison to the local road traffic. Vehicles visiting the proposed use are not expected to alter conditions as numbers are insufficient to increase ambient noise level and character is indistinguishable from existing vehicles.

