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Acoustic Assessment for proposed hot food take-away at 361 Yorkshire Street, Rochdale. OL16 2DT.

Prepared for:

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1. Introduction

1.1. Martin Environmental Solutions has been commissioned to undertake an acoustic and odour assessment to support a planning application for a hot food takeaway at 361 Yorkshire Street, Rochdale OL16 2DT.

Site Location and Context

1.2. The site is located to the north of Yorkshire Street, the busy A58. The property is an end terrace, with an open site to the east. The ground floor is a dessert take away with other commercial properties along the terrace, including another hot food take away. To the first floor and accessed from the rear are residential flats.

1.3. An aerial Photograph is enclosed in Figure 1.

1.4. It is the potential impact on the residents of the first floor that has prompted this assessment.

2. Policy and Guidance

Noise

2.1. The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It is recognised that on occasions it will be difficult to reconcile some land uses, such as housing, hospitals or schools, with other activities that generate high levels of noise. However, the planning system is tasked to ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development).

2.2. The Government's publication of the National Planning Policy Framework (NPPF), updated in February 2019, states that planning policies and decisions should prevent new and existing development from contributing to or being put at unacceptable risk from, of being adversely affected by unacceptable levels of noise pollution.

2.3. The Government have also issued the Noise Policy Statement for England (NPSE). The NPSE clarifies the Government's underlying principles and aims in relation to noise and sets a vision to promote good health and a good quality of life through the effective management of noise while having regard to the Government's sustainable development strategy. The NPSE aims to mitigate and minimise adverse impacts on health and quality of life through the effective management and control of noise.

2.4. The NPSE introduces the following terms, although no sound levels are given to represent these, many authorities have identified the sound level criteria in line with the World Health Organisation, BS8233:2014 and BS4142: 2014 levels. The terms introduced by the NPSE are:

NOEL – No Observed Effect Level (<30dB(A)inside <50dB(A) outside, 10dB below background)
LOAEL – Lowest Observed Adverse Effect Level (30-35dB(A) inside 50-55dB(A) outside, background to +5dB)
SOAEL – Significant Observed Adverse Effect Level (>35dB(A) inside, >55dB(A) outside, >+10dB above background)

2.5. The sound levels within the brackets of the previous paragraph are those determined as appropriate levels to indicate the relevant effect levels represented by the NPSE.

2.6. Other commonly used examples of standards utilised by Local Planning authorities for the consideration of noise impacts include comparison of the likely noise levels to be experienced at a development, with levels that have been recommended by the World Health Organisation (WHO) as Guidelines for the prevention of Community Noise Annoyance and within BS8233: 2014.

2.7. The WHO recommended noise levels for outdoor amenity areas (gardens) that should not be exceeded are 55dB(A) $L_{Aeq,16hr}$ in order to avoid 'Serious Community Annoyance or 50dB(A) $L_{Aeq,16hr}$ to avoid 'Moderate Community Annoyance' during the day. For indoor levels WHO set 35dB(A) $L_{Aeq,16hr}$ during the day to prevent Moderate Annoyance and 30 dB(A) $L_{Aeq,8hr}$ at night to prevent sleep disturbance.

2.8. The WHO guidance also recommends that maximum sound levels at night should not regularly exceed 45dB(A) within bedrooms to prevent sleep disturbance. Regularly is considered to be more than 10 times during any 8-hour night time period.

2.9. BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' also specifies desirable noise levels to be achieved inside dwellings.

2.10. BS 8233:2014 'Sound insulation and noise reduction for buildings – Code of Practice' also specifies desirable noise levels to be achieved inside dwellings. BS 8233 presents two levels, the first between the hours of 07:00 – 23:00 and the second between 23:00 -07:00.

2.11. The daytime period suggests internal noise levels of 35dB $L_{Aeq,16hr}$, for resting in living rooms and bedrooms while for night time a level of 30dB LAeq,8hr is recommended. Criteria for external areas mirrors that within the WHO guidance.

2.12. Another commonly used standard is British Standard 4142:2014 'Method for rating industrial and commercial sound' compares the sound predicted by the source in question against the background, L_{A90} sound levels.

2.13. The "residual" L_{Aeq} measurement is then subtracted from the "ambient" L_{Aeq} measurement (with the sound source) to calculate the sound level created by the "problem" sound alone -termed the "specific" sound level.

2.14. If the "problem" sound is tonal, such as whine or hum, or if it is impulsive such as bangs or clatters or if it is irregular enough to attract attention a correction is added to the "specific level" to produce the "rating level". The "background" L_{A90} measurement is then compared against the "rating level".

2.15. If the "rating level" exceeds the "background" by around 10dB(A) or more this "indicates a significant adverse impact". A difference of around 5dB(A) 'indicates an adverse impact. The lower the commercial noise level is, the lower the likely impact. In addition, the published 'ProPG Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development' provides a 4-staged approach to undertaking a risk assessment in relation to anticipated sound levels at new residential development and the provision of mitigation measures. The guidance is principally aimed at sites exposed predominantly to noise from transportation sources.

2.16. In addition, the 'ProPG Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development' provides a 4-staged approach to undertaking a risk assessment in relation to anticipated sound levels at new residential development and the provision of mitigation measures. The guidance is principally aimed at sites exposed predominantly to noise from transportation sources.

2.17. The first stage consists of an initial noise risk assessment, based on indicative day and night-time *noise* levels. Simply put, the higher the ambient noise in an area the greater the impact. The levels given are shown below although it should be noted that these are in excess of both the Lancashire guidance, WHO and BS 8233: 2014.

Noise Risk Category*	Potential Effect if Unmitigated	Pre-Planning Application Guidance
0 – Negligible $L_{Aeq,16hr}$ **<50dB** $L_{Aeq,8hr}$ **<40dB**	May be noticeable but no adverse effect on health and quality of life	In this category the development is likely to be acceptable from a noise perspective, nevertheless a good acoustic design process is encouraged to improve the existing environment and/or safeguard against possible future deterioration and to protect any designated tranquil areas. A noise assessment may be requested to demonstrate no adverse impact from noise. Application need not normally be delayed on noise grounds.
1 – Low $L_{Aeq,16hr}$ **50-63dB** $L_{Aeq,8hr}$ **40-55dB**	Adverse effect on health and quality of life	In this category the development may be refused unless a good acoustic design process is followed and is demonstrated via a Level 1 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised and that a significant adverse impact will not arise in the finished development. Planning conditions and other measures to control noise may be required.
2 – Medium $L_{Aeq,16hr}$ **63-69dB** $L_{Aeq,8hr}$ **55-60dB** L_{AFmax} **>80dB****	Significant adverse effect on health and quality of life	In this category the development is likely to be refused unless good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised, and clearly demonstrates that a significant adverse noise impact will not arise in the finished development. Planning conditions and other measures to control noise will normally be required.
3 – High $L_{Aeq,16hr}$ **>69dB** $L_{Aeq,8hr}$ **>60dB** L_{AFmax} **>80dB****	Unacceptable adverse effect of health and quality of life	In this category the development is very likely to be refused on noise grounds, even if a good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement. Applicants are advised to seek expert advice on possible mitigation measures. Advice on the circumstances when the refusal of a new housing on noise grounds should normally be anticipated is included in the ProPG.

2.18. Stage 2, consists of a full assessment of the prevailing ambient noise and requires 4 elements to be considered:

I. Element 1 – Good Acoustic Design
II. Element 2 – Internal Noise Level Guidelines
III. Element 3 – External Amenity Area Noise Assessment
IV. Element 4 – Assessment of Other Relevant Issues

2.19. A good acoustic design is implicit in meeting the requirements of the NPPF and can help to resolve many potential acoustic issues.

2.20. Details of the criteria considered suitable are provided above for both internal and external sound levels. Element 4 includes such issues as local and national policy, likely occupants, wider planning objectives.

3. The Assessment

3.1 The proposed development will see the current dessert take away changed to include an offering of hot food. This will involve the inclusion of an extraction system which will be located to the eastern gable end of the property and extending to the ridge. The gable end of the property is a blank wall.

3.2 On site monitoring was undertaken on the 25th February 2021. Due to the lack of any suitable location in which to leave the sound level meter, attended monitoring was undertaken between 21:00-00:00, representing the late-night opening times of the take-away, when traffic along the main road had reduced.

3.3 The proposed operating times mirror those already being used by the existing dessert take-away.

3.4 The monitoring was also undertaken during a period of lockdown for the Covid-19 pandemic and as such the background sound level may have been lower than normal. Resulting in a worse-case situation.

3.5 The results are shown in the table below. The sound level meter was field calibrated before and after the monitoring period with no significant deviation. The weather at the time was dry, still and cold. The meter was set up outside the first-floor residential property above the site, approx. 1m away from any reflections.

3.6 It is proposed to install an ELTA SLC560/4B-1AC inline fan to the extraction system. Manufacturers sound level data has been obtained for this fan, see Appendix A for details.

3.7 The nearest properties are the flat to the first floor, however the only windows are located to the front and rear of the site, approx. 4m away from the flue termination point, and the nearby properties along Park Road which back onto the site 12m away.

3.8 Appendix B provides detailed calculations of the resulting sound level at the nearby property following the inclusion of a 068-0560-D-P-1DEP sound attenuator into the extraction system. These take account of distance attenuation only and no account of the barrier attenuation of the building has been included. The inclusion of the attenuator will result in a sound level of 41dB(A) at the property, and should the window be left open 26dB(A) internally. Below the recommended levels within BS8233 and from the World Health Organisation.

3.9 Based on the above a BS4142:2014 calculation has also been undertaken. The lowest background data obtained during the monitoring period has been used within the calculation. This occurred between 23:00-00:00.

Measured Ambient sound level		
Residual Sound level	L_{Aeq} = 54.1dB	Measured on site
Background Sound Level	L_{A90} = 47.1dB	Measured on site
Reference period 15 minutes		Normal ref period, night-time
Specific sound Level	L_{Aeq} = 41dB	Calculated
Acoustic feature	2dB	2dB correct applied for slight tone at 250Hz, however level is still below the background sound level at this frequency.
Rating level	43dB	
Background sound level	L_{A90} = 47.1dB	
Excess of Rating level over background level	(43-47.1) dB = **-4.1dB** indicates no significant adverse impact	
Uncertainty		Extraction system is to be fitted to the gable end of the property and so an additional 'barrier' attenuation will be experienced from the positioning of the building itself.

3.10 The inclusion of the identified silencer attenuator will ensure that sound levels at the nearby residential properties will not result in any adverse impact, with should levels being below those identified within the relevant guidance documents identified in section 2 of the report.

3.11 To prevent any potential vibration issues affecting the first floor flat the flue should be fixed to the side of the building using appropriate anti-vibration mounts.

4 Conclusion

4.1 Following monitoring on site a suitable extraction fan and sound attenuator have been identified to ensure that no adverse impact will be experienced by the adjacent residential properties, and sound levels will be in line with the required standards.

4.2 The inclusion of the above mitigation measures, silencer and anti-vibration fixings, will ensure that the internal and external sound levels are acceptable and will result in a No Observe Effect on the future residents in line with the Noise Policy Statement for England.

4.3 As such the development will meet the objectives of the National Planning Policy Framework in ensuring that no significant adverse impact is experienced by the future residents. The development is therefore considered to be acceptable in terms of noise.

Figure 1 – Aerial Photograph



Appendix A – Fan and silencer details

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A BRAND OF eg BUILDING SERVICES

Technical Data - Fan Model SLC560/4B-1AC

Location: KEF1

Designation:

Performance - Required

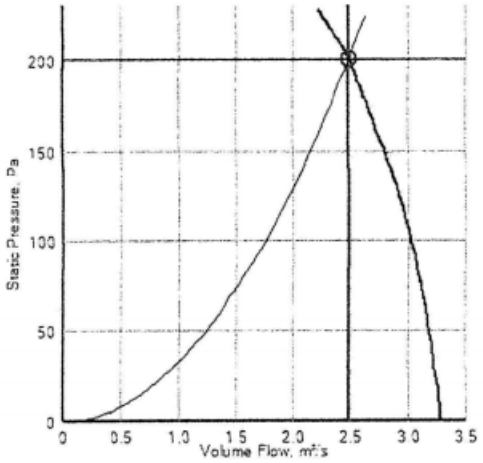
Air Flow :	2.48 m³/s
Static Pressure :	200 Pa
Selection Pressure:	200 Pa
Installation Type:	n/a
Air Density:	1.204 kg/m³
- Atmos. Temp:	20 °C
- Altitude: m	0 m
- Humidity:	0.0 %

Actual

Air Flow:	2.48 m³/s
Static Pressure:	200 Pa
Total Pressure:	262 Pa

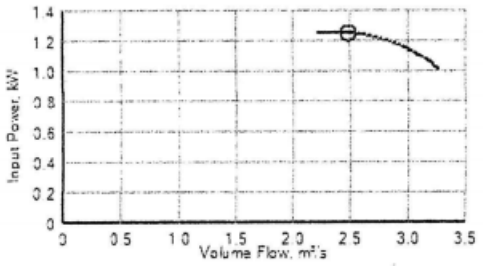
Fan Data

Catalogue Code:	SLC560/4B-1AC		
Description:	Axial Duct		
Diameter:	560 mm		
Impeller Type:	Axial		
Blade Material:	-		
Speed:	1460 RPM @50 Hz		
Power, Abs:	1.00	Peak:	1.00
Efficiency Total:	65.1%	Static:	49.9%
SFP:	0.50		
Fan Weight:	50.0 kg		



Motor Data (at STP)

Motor Type:	
Electrical Supply:	230V 1ph 50Hz
Motor Frame:	90
Motor Power:	1.10kW
FLC/Start (DOL):	6.38A / 37.00A
Motor Speed:	4 pole
Motor Efficiency:	79.3%



Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	77	74	80	75	75	74	72	66	85	60
Outlet (dB):	79	73	78	75	75	74	72	67	84	60

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

FLANGED SILENCER

Dynamic Insertion Loss & Pressure Graphs

Dynamic Insertion Loss

Fan Size	Silencer Length	Silencer Type	Insertion Loss @ Octave Band (Hz)							
			63	125	250	500	1k	2k	4k	8k
0250	1D	ENP	-2	-5	-6	-9	-13	-11	-6	-6
		EP	-4	-6	-8	-11	-14	-16	-11	-10
	2D	ENP	-4	-7	-10	-15	-19	-16	-12	-9
		EP	-7	-10	-15	-16	-15	-17	-13	-13
0315-0560	1D	ENP	-2	-5	-6	-9	-13	-11	-6	-6
		EP	-4	-6	-8	-11	-18	-19	-17	-14
	2D	ENP	-4	-8	-12	-17	-23	-17	-12	-10
		EP	-7	-10	-12	-21	-26	-26	-24	-22
0630-0800	1D	ENP	-3	-4	-9	-15	-15	-8	-7	-6
		EP	-4	-6	-8	-17	-23	-20	-18	-10
	2D	ENP	-6	-8	-13	-22	-22	-13	-12	-9
		EP	-8	-11	-16	-27	-32	-31	-29	-19
900-1000	1D	ENP	-3	-4	-9	-14	-13	-7	-7	-6
		EP	-4	-6	-11	-20	-18	-15	-13	-11
	2D	ENP	-6	-8	-13	-21	-18	-12	-11	-9
		EP	-8	-11	-18	-26	-27	-26	-22	-16

Appendix B – Sound level calculations

	63	125	250	500	1000	2000	4000	8000	Lw	Lp@4m
ELTA SLC50/4B-1AC	79	73	78	75	75	74	72	67	84	60
silencer - 560mm	4	6	8	11	18	19	17	14		
a-weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1		
resulting sound level	48.8	50.9	61.4	60.8	57	56.2	56	51.9	61.3	41

Octave data 4m from extraction system

	63	125	250	500	1000	2000	4000	8000	Lw	Lp@4m
resulting sound level @4m	28.8	30.9	41.4	40.8	37.0	36.2	36.0	31.9		41

15-minute Background, including octaves

Start Time	End Time	Duration	Leq (LAeq)	L90 (LAeq)	Leq (63 Hz	Leq (125 H	Leq (250 H	Leq (500 H	Leq (1 kHz	Leq (2 kHz	Leq (4 kHz	Leq (8 kHz
25/02/2021 23:00	25/02/2021 23:15	00:14:58	56.2	50.9	58.8	58.3	52.7	51.3	53.4	48.6	34.6	23.7
25/02/2021 23:15	25/02/2021 23:30	00:15:00	55.3	49.6	58.8	57.3	52.5	50.9	52.4	47.3	36.1	31.7
25/02/2021 23:30	25/02/2021 23:45	00:15:00	54.8	49.1	59.8	57	51.9	50.9	51.9	46.5	34.8	25.1
25/02/2021 23:45	26/02/2021 00:00	00:15:00	54.1	47.1	57.2	52.9	50.5	50	51.3	46.2	33.2	24.1