

Technical Memorandum

To: Samantha Parkin (EAMAR Developments UK Ltd), Ahmed Yaseen (Crown Advisory)
From: Mike Potts (Echo Acoustics)
CC: Fozia Alharby (EAMAR Developments UK Ltd), Simon Plowman (Plan8 Town Planning)
Date: 26 March 2021
Re: San Court, 25-33 Wilmslow Road, Manchester, M14 5TB: review of Conditions 5 & 6 of planning consent 111739/FO/2016/S1 - glazing, ventilation and plant equipment noises

This document provides the results of a review and investigation of:

1. The glazing and habitable room ventilation of the residential apartments, specifically those with windows on the western façade overlooking the A34 Wilmslow Road, this being the dominant source of noise affecting the development.
2. Externally-mounted equipment at the rear (eastern façade) of the building, specifically that associated with the ground floor residential commercial uses.

The building, which is now completely constructed, comprises commercial uses at ground floor level and a number of residential apartments on the upper storeys.

The construction of the building was granted planning consent by Manchester City Council on 28 April 2016 (planning reference: 111739/FO/2016/S1). Condition 5 of the consent states:

"Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Wilmslow Road and other sources of noise on or near the site, shall be submitted to and approved in writing by the City Council as local planning authority. The approved noise insulation scheme shall be completed before any of the dwelling units are occupied.

Noise survey data must include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary. The internal noise criteria are as follows:

Bedrooms (night time - 23.00 - 07.00) 30 dB LAeq (individual noise events shall not normally exceed 45 dB LAmax,F by more than 15 times)

Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq

Gardens and terraces (daytime) 55 dB LAeq

Additionally, where entertainment noise is a factor in the noise climate the sound insulation scheme shall be designed to achieve internal noise levels in the 63Hz and 125Hz octave centre frequency bands so as not to exceed (in habitable rooms) 47dB and 41dB, respectively.

Reason: To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance, pursuant to Policies DM1 in the Core Strategy Development Plan Document and saved UDP Policy DC26”.

Entertainment noise is not a factor within the local ambient noise.

Condition 6 of the permission states:

“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. The scheme shall be submitted to and approved in writing by the City Council as local planning authority prior to the installation of any equipment, in order to secure a reduction in the level of noise emanating from the site.

Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site pursuant to Policy DM1 in the Core Strategy Development Plan Document and saved UDP Policy DC26”.

Condition 5 review

In 2019 an application for discharge of planning conditions, including condition 5, was submitted to Manchester City Council (planning reference: CDN/19/0383). However, on 7 May of that year, the Council refused that application. In reference to condition 5, the Decision Notice stated:

The additional information requested in respect of the discharge of Condition 5 noise insulation has not been provided and the condition cannot therefore be discharged.

The Contractor at that time, Jordon Contractors Ltd, commissioned Acoustic & Engineering Consultants Limited (AEC) to undertake an assessment of the noise affecting the site and to recommend suitable noise mitigation measures, to enable the discharge of Condition 5.

AEC undertook a noise measurement survey on the site which, at that time, had been levelled. The findings of that noise survey and subsequent recommendations for noise mitigation measures, was submitted on 16 May 2019¹.

Table 1 of the AEC report provides the noise measurement data. For the western façade facing Wilmslow Road, the traffic-related noise levels are given as **64 dB LAeq** for both the 16-hour daytime and 8-hour night time periods; this is unusual but reflects the 24-hour economy that exists in this vicinity plus the fact that it is a principal transport corridor, throughout the day and night, between the City Centre and the area of South Manchester.

As a result of their assessment, AEC concluded that the following glazing and ventilation specifications would provide suitable protection of residential amenity for future occupants of the development, presented in that report as Table 2 and reproduced here as Table 1:

¹ AEC Ltd, 2016 San Court, 25-33 Wilmslow Road, Rusholme, Manchester – Review of Glazing and Ventilation System (document reference: P3396/L03/PJK)

Table 1: AEC recommended noise mitigation measures

Elevation (Measurement Location)	Habitable Room	Percentage of Glazed Area	Sound Insulation Value	
			Glazing	Ventilation
West (A)	Living Room	60%	36dBR _w / 29dBR _w + C _{tr}	38dBD _{n,e,w}
		100%	38dBR _w / 32dBR _w + C _{tr}	38dBD _{n,e,w}
	Bedroom	25%	40dBR _w / 34dBR _w + C _{tr}	44dBD _{n,e,w}
		50%	46dBR _w / 37dBR _w + C _{tr}	MV*
		100%	49dBR _w / 45dBR _w + C _{tr}	MV*
North/South	Living Room	<100%	31dBR _w / 25dBR _w + C _{tr}	36dBD _{n,e,w}
	Bedroom	<100%	31dBR _w / 25dBR _w + C _{tr}	36dBD _{n,e,w}
East (B)	Living Room	<100%	31dBR _w / 25dBR _w + C _{tr}	33dBD _{n,e,w}
	Bedroom	<100%	31dBR _w / 25dBR _w + C _{tr}	33dBD _{n,e,w}

*** Mechanical Ventilation**

On 20 July 2020, in an e-mail between Dave Morris (MCC Planning Officer) and Adam Garner of EAMAR Developments Ltd, Mr Morris notes the following comments from his colleagues in the Council's Environmental Health Department:

"In addition further details of mechanical ventilation is needed, as open windows cannot meet MCC criteria, trickle vents are not sufficient".

Living/dining room:

Subsequent to this, following consultation with the Council's Environmental Health Department (EHD), a noise measurement survey was undertaken by Echo Acoustics on Friday 15 January 2021; this comprised concurrent measurement of noise on a second-floor balcony overlooking Wilmslow Road, in line with the front building façade, and measurement within the open plan lounge/dining room of the apartment, approximately 1 metre from the window. Figure 1 shows the two meters in position.

Figure 1: Measurement positions



The survey utilised a Casella CEL 633C Class 1 integrating, averaging sound level meter inside the apartment, and a Bruell & Kjaer 2250 Class 1 integrating, averaging sound level meter on the balcony. The meters were time-synchronised to ensure the data were comparable.

Measurements comprised one 15-minute measurement with the window trickle ventilator open and one 15-minute measurement with the ventilator closed. A night time noise survey was not conducted as traffic levels are significantly affected by the current pandemic-related restrictions on movement.

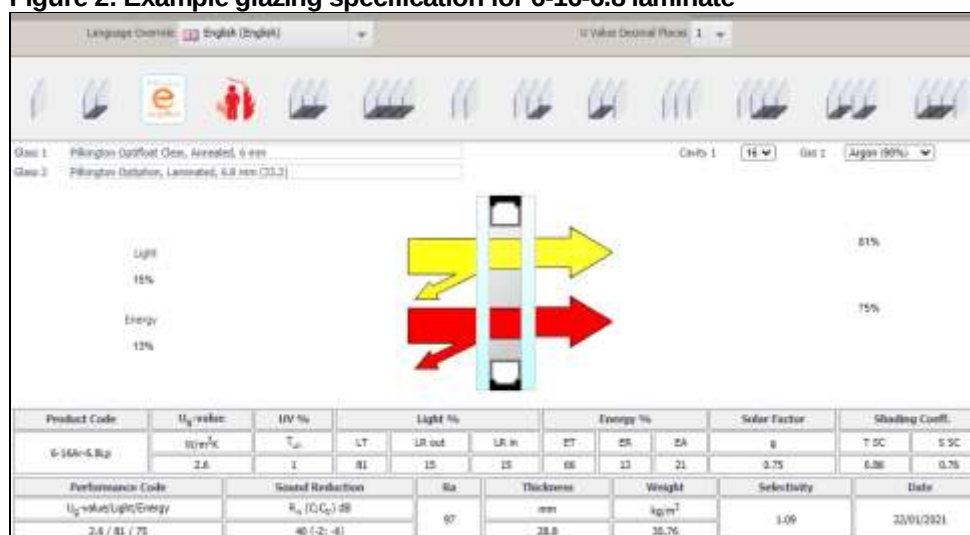
Both meters have been laboratory-calibrated within the last 12 months and the calibration certificates are available for inspection. The meters were field-calibrated before and after the measurements and no significant variation in calibration tone was observed.

The weather at the time of the survey was cold (6 Celsius) with no wind and no precipitation, although the roads were damp from overnight rain.

Traffic using Wilmslow Road during the survey included a full range of vehicles from motorcycles to heavy goods vehicles.

It has been confirmed with the glazing installer that the windows on this façade comprise two panes of glass, one float glass panel 6mm in thickness and the other 6.8mm in thickness with an acoustic laminate embedded in the pane; the performance specification for this type of glazing, derived using the Pilkington Spectrum online software, is 34 dB $R_w + C_{tr}$, as indicated in Figure 2.

Figure 2: Example glazing specification for 6-16-6.8 laminate



The trickle ventilation units installed are Greenwood EA2500 acoustic trickle ventilator units which have an acoustic performance specification of 40 dB $D_{n,e,w} + C_{tr}$ ².

These specifications are higher than those recommended by AEC for living rooms, where the glazing comprises approximately 90% of the façade.

The data from the survey on 15 January are presented in Table 2.

² <https://www.greenwood.co.uk/product/95/2500ea-5000ea>

Table 2: Measurement survey data 15 January 2021

Time	Vent position	Measured noise (dB L _{Aeq, 5min})		Difference (dB)
		Balcony	Lounge	
11:40	Closed	63.7	32.7	31.0
11:45		65.0	33.7	31.3
11:50		65.9	35.1	30.8
12:00	Open	64.9	35.6	29.3
12:05		68.4*	38.0*	30.4
12:10		65.6	36.0	29.6

* Passage of 2 ambulances nearby

The 30 to 31 level difference demonstrated by the data in table 2 is marginally lower than the 34 dB dB R_w + C_r performance suggested for this glazing specification, from Figure 2.

It is interesting to note that, despite the current pandemic situation, the measured noise levels are broadly similar to those recorded by AEC in 2019. The levels are marginally higher in most cases but this is likely, partly due to the damp road surfaces plus the fact that relatively short-term measurements are generally always higher than longer-term measurements, where the time-averaging effects tend to reduce the measured noise level, relatively speaking.

Discounting the elevated short-term data noise level associated with the passage of two ambulances, the data indicate that the currently installed glazing and ventilation noise levels are commensurate with the conditioned noise level for living rooms and bedrooms used during the day.

External amenity areas:

The external noise levels on the balcony are, potentially, approximately 10 to 11 dB greater than the level required by condition 5. However, not only are the balconies extremely small and, potentially, of limited use with respect to residential amenity, at Section 7.7.3.2 of BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings* ("Design criteria for external noise"), the standard suggests that:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments. 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."

Consequently, whilst the measured noise levels for balconies are greater than the BS 8233 and condition 5 levels, the limited use of the balconies along with the derogation provided by 7.7.3.2 BS 8233 suggests that the levels can be considered acceptable and that **condition 5 should be considered to have been complied with in this respect.**

Bedrooms:

The data in Table 2 indicate that the measured noise level is greater than the conditioned levels for bedrooms at night; it is worth noting that, typically, there is little variation between day and night time noise levels in this area due to the 24-hour nature of the local commerce with the previous AEC assessment having measured the traffic-related noise levels at **64 dB L_{Aeq}** for both the 16-hour daytime and 8-hour night time periods.

Consequently, a further noise measurement survey was undertaken on Monday 8 March 2021, on the balcony and within the 2 bedrooms of the apartment, as indicated in Figure 3. The meter used was the same as that used in the January survey. The road conditions were dry at the time and there was negligible wind.

Figure 3: Meter set up in bedroom



The data from this assessment are presented in Table 3.

Table 3: Measurement survey data 8 March 2021

Location	Time	Duration (mins)	Measured noise (dB)	
			L_{Aeq}	L_{AFmax}
Balcony	12:03	15	64.7	80.7
Bedroom 1	11:00		30.6	60.2
	11:15		28.8	54.4
	11:30		29.6	59.0
Bedroom 2	11:47		30.7	60.4

The data recorded on the balcony indicate that external noise levels on the day were broadly commensurate with those measured previously by AEC and by Echo Acoustics (January 2021).

The glazing and ventilation specifications in the bedrooms are the same as for the lounge/dining rooms.

The data show that the ambient (L_{Aeq}) noise levels in bedrooms are in compliance with the conditioned noise level of 30 dB L_{Aeq} . However, the maximum noise level is up to 15 dB greater than the conditioned noise level of 45 dB L_{Amax} . **Additional noise mitigation measures will be required.**

With respect to the ventilation issue, the currently-installed trickle ventilation units provide suitable levels of passive background air exchange. However, the Council's EHD have stated that this is insufficient to provide comfort/cooling ventilation in hot weather. Consequently, **additional means of providing greater levels of forced ventilation will be required** in order to ensure sufficient levels of air exchange in hot weather.

Condition 6 review

Other than the kitchen/bathroom ventilators associated with the apartments, the only external plant equipment on the building's eastern façade are:

1. A small, constantly-operating Xpelair™ extraction fan for the bin-store, located at ground level close to the building (Figure 4).
2. Three small ambient air ventilation units associated with Units 5 and 6 at ground floor (Figure 5).

Figure 4: Bin store extractor



Figure 5: Units 5 & 6 extractor outlets



Assessment of the noise from these units requires knowledge of the pre-development 'background' (L_{A90} or 90th percentile) noise level and the operational equivalent continuous (L_{Aeq}) ('specific') noise from the fans themselves. The assessment focuses on the, potentially, more sensitive night time period.

The pre-development background noise levels available are those provided by AEC's previously submitted report³. This provided background noise levels measured at the centre of the development site, after the previous building on the site had been demolished.

³ AEC Ltd, 2016 *San Court, 25-33 Wilmslow Road, Rusholme, Manchester – Plant Noise Assessment* (document reference: P3396/L02/PJK)

However, the Council queried the validity of this data on the basis that it had been recorded on a Friday evening which, in their view, was potentially one of the noisiest parts of the week.

Consequently, in agreement with the EHD, the background noise level used for this assessment was the value recorded by AEC (46 dB L_{A90}) minus 4 dB, namely 42 dB L_{A90} . The conditioned requirement, therefore, is that the plant equipment should not exceed a rating level of 37 dB $L_{A_{r,Tr}}$ at the nearest noise sensitive receptor.

The noise from the plant equipment was recorded on the evening of 25 March 2021, using the same meter as for previous surveys. The weather at the time was cold and dry with negligible wind.

Due to the presence of a significant quantity of external plant equipment operating in the area, associated with other commercial operations, in addition to significant noise from vehicles and people in the streets, measurements were recorded very close to each item of equipment to minimise adverse interference by the external noises. The measurements were made at 0.5m from the centre of the Xpelair fan and 0.9m from the centre of the group of 3 outlet vents associated with Units 5 & 6. It was estimated that the closest residential receptor position was a rear, first floor window of 2 Banff Road, approximately equidistant from the 2 sets of fans at a distance of approximately 10 metres.

The data recorded are presented in Table 4.

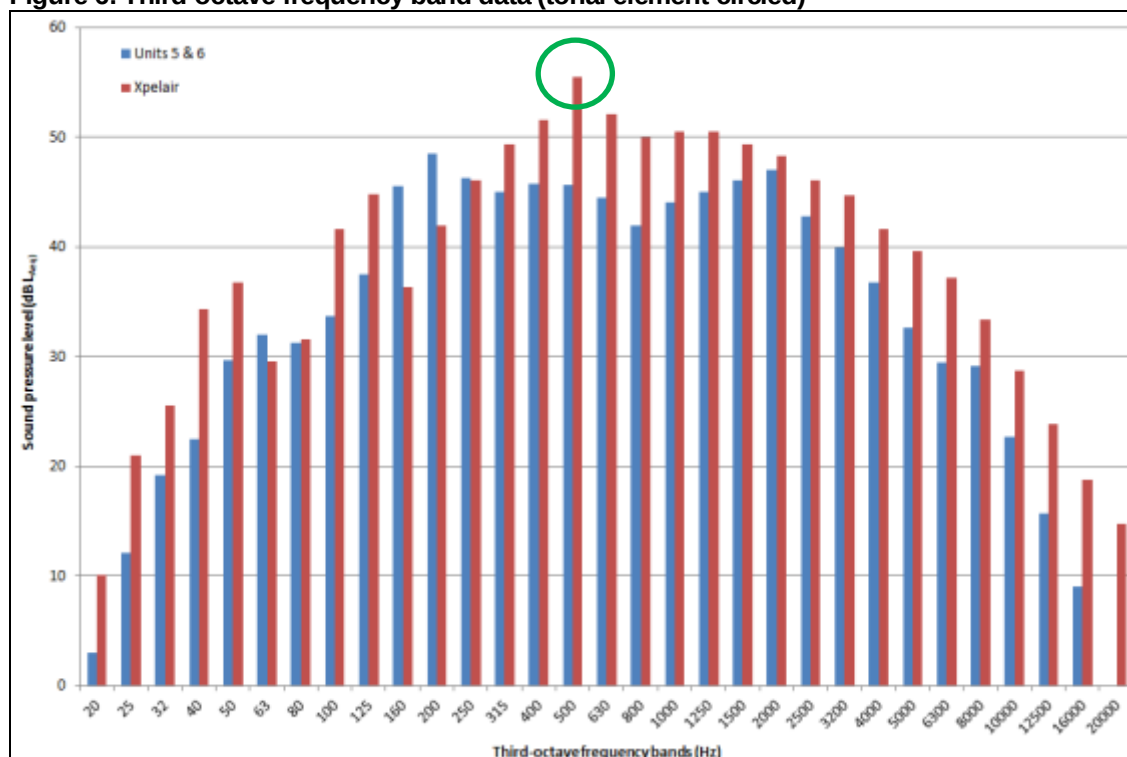
Table 4: External plant equipment noise measurements

Item	Time	Duration (sec)	Measured noise (dB L_{Aeq})
Xpelair	19:01:47	47	61.5
	19:03:03	28	61.6
Average:			61.6
Unit 5 & 6	19:04:24	64	57.0
	19:06:15	77	57.0
Average:			57.0

The data in Table 4 were used to calculate the combined noise level at the nearest receptor; this was calculated to be 33.8 dB L_{Aeq} .

Examination of the third-octave frequency band data for each item equipment, presented in Figure 6, noted a slight tonal element for the Xpelair fan, in the 500Hz band; this was barely audible on site. However, it was considered that it would be appropriate to add a 3 dB 'character correction' penalty for this element, in accordance with the guidance in British

Figure 6: Third-octave frequency band data (tonal element circled)



Thus, the rating noise level of the plant equipment, at the nearest receptor position, was predicted to be 36.8 dB L_{Ar, Tr}. This is 0.2 dB below the conditioned level which indicates that no additional noise control measures will be required.

Additional requirements

The assessment has demonstrated the need for the following physical interventions for San Court:

1. Bedrooms on the western façade overlooking Wilmslow Road will require the installation of openable secondary glazing units to ensure night time maximum noise levels in bedrooms achieve the levels set out in planning condition 5.
2. The Apartments will require the installation of acoustically-attenuating mechanical ventilation units, with 'boost' function, to enable suitable levels of cooling and ventilation in hot weather.

Conclusion

This assessment has shown that the glazing and ventilation currently installed in the western façade of San Court, provides:

- External and internal noise levels, in living rooms, in compliance with the requirements of planning condition 5.
- Night time ambient (L_{Aeq}) noise levels in bedrooms in compliance with the requirements of planning condition 5.
- Night time maximum (L_{Amax}) noise levels in bedrooms up to 15 dB greater than the level specified in planning condition 5. The assessment recommends the fitting of secondary (single) glazing on the inside of the window, with a minimum spacing of 150mm from the double glazed window units. The secondary glazing must be capable of being opened and allow access to the double glazed window. The reveal between the two sets of glazing must be lined with an acoustically absorbent material.
- Acoustically-attenuating mechanical ventilation will be required in order to provide sufficient levels of comfort/cooling air exchange in hot weather.

The assessment concludes that, with the fitting of these measures, planning conditions 5 and 6 of planning consent 111739/FO/2016/S1 will be complied with.