



PROJECT TECHNICAL MEMORANDUM

PROJECT : Commercial Street Development,
Knott Mill, Manchester

OUR REF : 28581-PTM1-MFH-R0

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ISSUED TO : Chris Bradley – Bradley Architecture

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RE: PLANNING CONDITIONS 6 & 7 FAÇADE SOUND INSULATION & PLANT NOISE EGRESS

1.0 Planning Conditions

This memorandum outlines the project's scheme for acoustically insulating the residential accommodation against external noise in accordance with Planning Condition 6 and Planning Condition 7

1.1 Planning Condition 6

Planning Condition 6 states:

“Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from neighbouring roads and the railway line shall be submitted to and approved in writing by the City Council as local planning authority.

There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. 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 following noise criteria will be required to be achieved:

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

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

Gardens and terraces (daytime) 55 dB LAeq



Upon completion of the development and before first occupation of the residential units, a verification report will 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 the internal noise criteria has 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 internal noise criteria"

1.2 Planning Condition 7

Planning Condition 7 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 in order to secure a reduction in the level of noise emanating from the site. The approved scheme shall be completed before the premises is occupied.

Upon completion of the development a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations 128433/FO/2020 Page 5 of 12 and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria has 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."

2.0 Prevailing Noise Climate

A detailed environmental noise survey of the site was undertaken by Hann Tucker Associates in October 2020. The results of their survey informed a detailed noise impact assessment of the proposed development considering road/rail traffic as presented in their Commercial Street Development, Knot Mill, Manchester (28295/NIA1), which accompanied the scheme's planning application.

The Report confirmed dominant noise sources to be:-

Road: Road traffic noise from Commercial Street to the west, Little Peter Street to the north and Constance Street to the east.

Rail: Overground train movements on raised train lines running to the north of the site.



In addition to the measured survey data, we have reviewed subsequent data from nearby schemes to validate the 2020 survey. In particular, the most recent nearby detailed noise survey was undertaken in 2003 by Peter Jackson at the same site at Commercial Street as part of planning application 069457/FO/2003/C3. The noise data within this report was found to be congruent with our 2020 survey data.

3.0 Agreed Acoustic Criteria

3.1 Acceptable Noise Levels within Dwellings

BS 8233:2014, which is referenced in Condition 6, states the following noise limits:-

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB L _{Aeq,16hour}	-
Dining	Dining Room/Area	40 dB L _{Aeq,16hour}	-
Sleeping (Daytime Resting)	Bedroom	35 dB L _{Aeq,16hour}	30 dB L _{Aeq,8hour}

BS 8233:2014 also states that where regular individual noise events (e.g. scheduled aircraft or passing trains) are present it may be appropriate to set a L_{Amax} criterion for bedrooms at night of 45dB L_{Afmax} to not be exceeded more than 15 times during any night-time period. This criterion is in line with the LPA guidance and previous iterations of BS 8233.

3.2 Fixed Plant Noise Emission Criteria

Based the planning requirements and the background noise levels presented in the Hann Tucker Associates noise impact assessment report (Ref: 128295-RP-NIA1-Rev0-MFH dated 28 October 2020), we would propose the following plant noise emission limits for the development to be achieved with plant operating cumulatively at 1m from noise sensitive windows.

Period	Cumulative Plant Noise Emission Limit (BS 4142:2014 Rating Level)
Daytime (07:00-23:00)	44 dBA
Night-time (23:00-07:00)	38 dBA

The Hann Tucker Associates Report sets the plant noise egress limits in A-weighted values. As such, while the calculated presented below have been carried out in octave bands, only the A-weighted values have been compared against the criteria and our noise egress calculations.



4.0 External Noise Intrusion Assessment (Condition 6)

4.1 Overview

An assessment has been carried out in accordance with BS 8233's rigorous calculation method (as per below equation) to determine the sound reduction performance requirements of residential facades.

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{-\frac{D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{-\frac{R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{-\frac{R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{-\frac{R_{rr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

The assessment considers the habitable room layouts and façade dimensions of the Bradley Architecture drawings dated April 2021.

Incident external noise levels onto facades have been determined by noise levels measured around the site boundary and proposed building façade location.

Residential facades shall comprise of the following:

External Walls: 102.5mm facing brick, 125mm fully insulated cavity, 2No. leaf of facing brick internally.

Windows/Cladding: Steel framed double-glazed openable windows/doors.

Roofs: 200mm in-situ concrete slab.

Ventilation/Cooling: MVHR whole dwelling ventilation. With atmospheric intake and exhaust on the roof which drops into a ground floor cupboard.

For the purpose of further calculation we have considered the following sound reduction performance for the external wall construction. These figures have been derived using INSUL 'sound reduction' software and our in-house database of published performance test results for similar build ups.

Element	Anticipated Min. Sound Reduction, R (dB) at Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
External Walls	40	45	45	49	58	65	65



4.2 Sound Reduction Performance Specification for Glazing/Cladding Systems

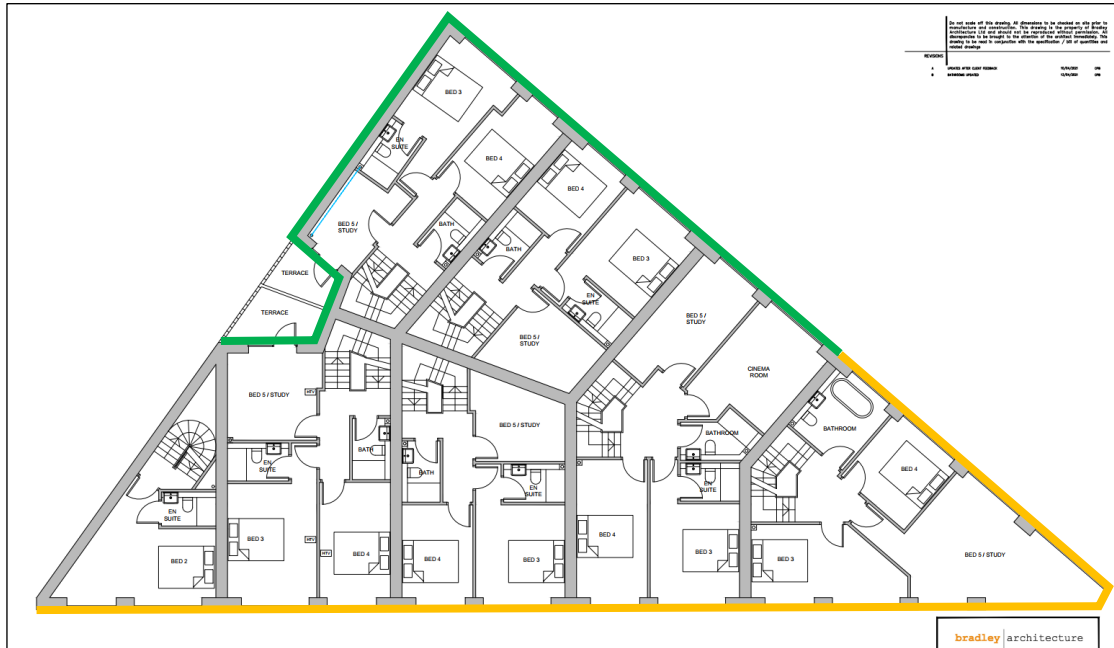
The following table presents the minimum octave band sound reduction performance requirements for the cladding systems. In all cases, it is essential that the system is tested in accordance with BS EN ISO 10140-2 and that the octave band specifications are met by the system as a whole (i.e. the complete assembly – the frame, glass, spandrel panels, seals, etc. – and not just the glass).

Spec Ref.	Colour Zone*	Minimum Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)						
		63	125	250	500	1k	2k	4k
A	GREEN	20	22	20	26	30	35	38
B	ORANGE	24	24	22	32	36	42	43

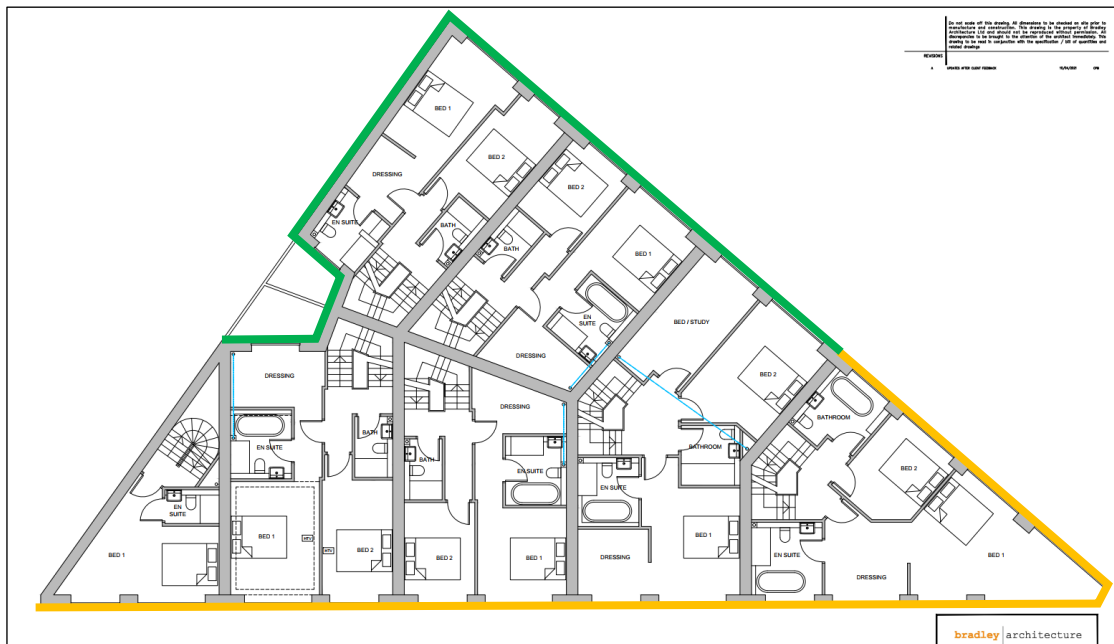
*Ref. sketch zone plans below



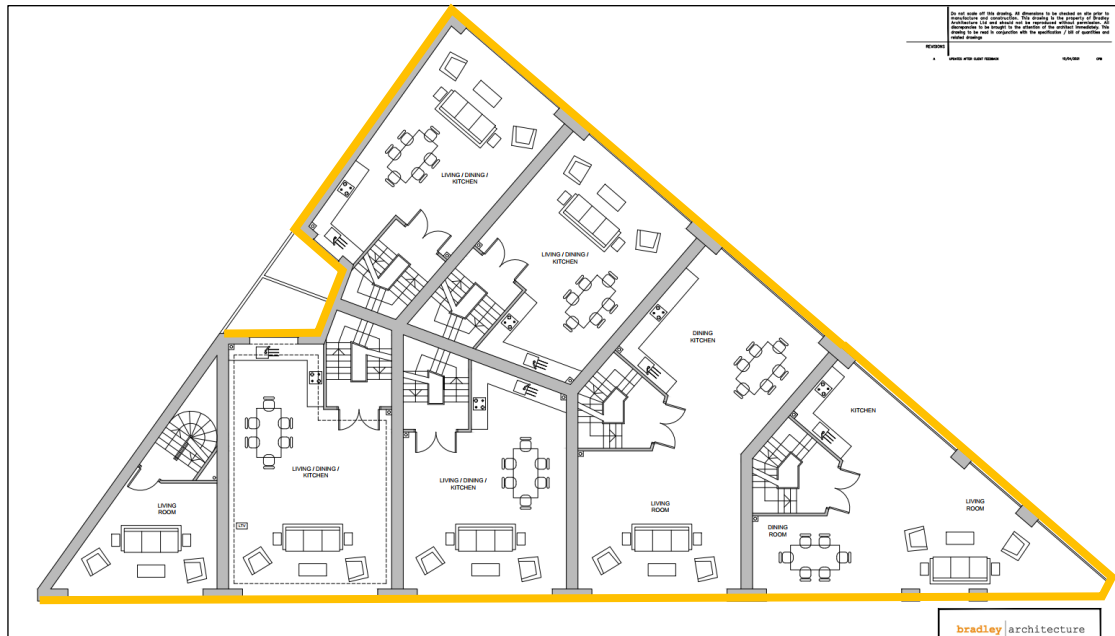
Ground Floor



First Floor



Second Floor



Third Floor

It is essential that prospective cladding system suppliers can demonstrate complete assemblies comply with the acoustic performance detailed in our specification rather than simply offering a generic frame and glazing configurations. However, for guidance, we would suggest that the following glass configurations could typically be expected to provide the required levels of sound insulation.

Spec Ref.	Colour Zone	Example Glazing Configuration
A	GREEN	6 mm / 16 mm / 6 mm
B	ORANGE	8 mm / 16 mm / 6.4 mm (Ac lam)

4.3 Sample Calculations

The parameters used within our assessment for 'typical' apartments are presented below, followed by a selection of corresponding sample calculations.

Term	Derivation	Bedroom (m ²)	Living Room (m ²)
S _f	Façade area – Overlooking Commercial Street	15.4	16.2
	Façade area – Overlooking Constance Street	7.0	16.7
S _{wi}	Glazing area – Overlooking Commercial Street	11.6	13.5
	Glazing area – Overlooking Constance Street	6.5	13.5
S _{ew}	External wall area	S _f - S _{wi}	S _f - S _{wi}
-	Room floor area	12.0	36.0

**4.3.1 Commercial Street Elevation– Living Room (Daytime $L_{Aeq,16hr}$)**

Desc.	Octave Band Centre Frequency (Hz)						Single Figure
	125	250	500	1k	2k	4k	
External noise level, $L_{eq,ff}$	57	54	54	56	52	50	60 dB L_{Aeq}
External wall, R_{ew}	45	45	49	58	65	65	-
Glazing, R_w	24	22	32	36	42	43	ORANGE SPEC
+10 x log(S/A)	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	
+3	3	3	3	3	3	3	
Internal noise level, $L_{eq,2}$	34	33	23	21	11	8	28 dB L_{Aeq}

4.3.2 Commercial Street Elevation– Bedroom (Night-time $L_{Aeq,8hr}$)

Desc.	Octave Band Centre Frequency (Hz)						Single Figure
	125	250	500	1k	2k	4k	
External noise level, $L_{max,ff}$	56	51	52	52	46	41	55 dB L_{Amax}
External wall, R_{ew}	45	45	49	58	65	65	-
Glazing, R_w	24	21	32	37	42	43	ORANGE SPEC
+10 x log(S/A)	0.2	0.2	0.2	0.2	0.2	0.2	
+3	3	3	3	3	3	3	
Internal noise level, $L_{eq,2}$	34	31	22	18	5	0	28 dB L_{Amax}

4.3.3 Commercial Street Elevation– Bedroom (Night-time L_{Amax})

Desc.	Octave Band Centre Frequency (Hz)						Single Figure
	125	250	500	1k	2k	4k	
External noise level, $L_{max,ff}$	70	67	72	75	64	62	77 dB L_{Amax}
External wall, R_{ew}	45	45	49	58	65	65	-
Glazing, R_w	24	21	32	37	42	43	ORANGE SPEC
+10 x log(S/A)	0.2	0.2	0.2	0.2	0.2	0.2	
+3	3	3	3	3	3	3	
Internal noise level, $L_{max,2}$	48	47	42	41	24	21	45 dB L_{Amax}

**4.3.4 Constance Street Elevation– Living Room (Daytime $L_{Aeq,16hr}$)**

Desc.	Octave Band Centre Frequency (Hz)						Single Figure
	125	250	500	1k	2k	4k	
External noise level, $L_{eq,ff}$	57	57	53	54	50	45	58 dB L_{Aeq}
External wall, R_{ew}	45	45	49	58	65	65	-
Glazing, R_w	24	21	32	37	42	43	ORANGE SPEC
+10 x log(S/A)	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	
+3	3	3	3	3	3	3	
Internal noise level, $L_{eq,2}$	34	36	22	19	9	3	29 dB L_{Aeq}

4.3.5 Commercial Street Elevation– Bedroom (Night-time $L_{Aeq,8hr}$)

Desc.	Octave Band Centre Frequency (Hz)						Single Figure
	125	250	500	1k	2k	4k	
External noise level, $L_{max,ff}$	51	51	51	50	45	38	53 dB L_{Amax}
External wall, R_{ew}	45	45	49	58	65	65	-
Glazing, R_w	22	20	26	30	35	38	GREEN SPEC
+10 x log(S/A)	0.2	0.2	0.2	0.2	0.2	0.2	
+3	3	3	3	3	3	3	
Internal noise level, $L_{eq,2}$	30	32	26	21	11	1	27 dB L_{Aeq}

4.3.6 Constance Street Elevation– Bedroom (Night-time L_{Amax})

Desc.	Octave Band Centre Frequency (Hz)						Single Figure
	125	250	500	1k	2k	4k	
External noise level, $L_{max,ff}$	60	66	68	68	62	56	71 dB L_{Amax}
External wall, R_{ew}	45	45	49	58	65	65	-
Glazing, R_w	22	20	26	30	35	38	GREEN SPEC
+10 x log(S/A)	0.2	0.2	0.2	0.2	0.2	0.2	
+3	3	3	3	3	3	3	
Internal noise level, $L_{max,2}$	39	47	43	39	28	19	44 dB L_{Amax}

Based on the above, it can be seen that the proposed glazing specifications should be capable of providing adequate sound reduction to achieve internal noise levels below the limits set by MCC for all glazing configurations. Consequently, it is considered that the above specifications and calculations demonstrate compliance with the pre-commencement requirement of Planning Condition 6.



5.0 Plant Noise Assessment (Condition 7)

Craig Arrowsmith of APL Mechanical Services and Chris Bradley of Bradley Architecture have confirmed the external plant items related to the site consist of individual dwelling ventilation systems (i.e. MVHR).

Noise data for MVHR units provided within the scheme has been advised by APL Mechanical Services, and typical ductwork layouts within apartments provided by Bradley Architecture. The following table presents the acoustic data for the proposed ventilation systems running at typical duty.

Model		Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Vent-Axia Sentinel Kinetic FH	Open Inlet Sound Power Level (dB)	85	75	73	78	65	59	52	47
	Open Outlet Sound Power Level (dB)	84	65	65	66	57	78	38	31
Vent-Axia Integra Plus EC	Open Inlet Sound Power Level (dB)	39	43	45	47	43	36	29	31
	Open Outlet Sound Power Level (dB)	47	42	39	40	36	28	28	33

5.1 Noise Egress Calculations

Octave band calculations have been undertaken to establish a cumulative (worst-case) sound pressure level at the nearest residential receptor to the development. The calculation of sound pressure levels are presented in the following table for the nearest noise sensitive daytime and night-time receptors and reported as an A-weighted value only so that direct comparison with the plant noise limits set out in Section 3.2.

The nearest noise sensitive receptor during the daytime is the offices approximately 8m from the site boundary to the west of the development. The nearest noise sensitive receptors during the night time period is the residential building approximately 19m to the north of the site boundary

**5.1.1 Daytime Receptor Noise Egress Calculations**Vent-Axia Sentinel Kinetic MVHR Units Fresh Air Inlet

	Sound Pressure Level (dB re 2×10^{-5} Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Power Level	85	75	73	78	65	59	52	47	76
Sound Pressure Level at 1m from atmospheric termination	56	48	48	59	50	44	37	32	57
Distance Correction	-26	-26	-26	-26	-26	-26	-26	-26	
Directionality	0	0	0	0	0	0	-4	-7	
Quantity Correction (6No)	+8	+8	+8	+8	+8	+8	+8	+8	
Calculated Noise Level at Receptor	38	30	30	41	32	26	15	7	39

Vent-Axia Sentinel Integra Plus EC MVHR Units Exhaust

	Sound Pressure Level (dB re 2×10^{-5} Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Power Level	84	65	65	66	57	78	38	31	79
Sound Pressure Level at 1m from atmospheric termination	54	38	40	47	41	33	23	16	46
Distance Correction	-26	-26	-26	-26	-26	-26	-26	-26	
Directionality	0	0	0	0	0	0	-4	-7	
Quantity Correction (6No)	+8	+8	+8	+8	+8	+8	+8	+8	
Calculated Noise Level at Receptor	36	20	22	29	23	15	5	0	28

Vent-Axia Kinetic MVHR Units Fresh Air Inlet

	Sound Pressure Level (dB re 2×10^{-5} Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Power Level	39	43	45	47	43	36	29	31	
Sound Pressure Level at 1m from atmospheric termination	10	16	20	28	27	21	14	16	30
Distance Correction	-24	-24	-24	-24	-24	-24	-24	-24	
Directionality	0	0	0	0	0	0	-4	-7	
Quantity Correction (1No)	0	0	0	0	0	0	0	0	
Calculated Noise Level at Receptor	0	0	0	5	3	0	0	0	9

Vent-Axia Integra Plus EC MVHR Units Exhaust

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Power Level	47	42	39	40	36	28	28	33	
Sound Pressure Level at 1m from atmospheric termination	18	15	14	22	20	13	13	17	24
Distance Correction	-24	-24	-24	-24	-24	-24	-24	-24	
Directionality	0	0	0	0	0	0	-4	-7	
Quantity Correction (1No)	0	0	0	0	0	0	0	0	
Calculated Noise Level 0 Receptor	0	0	0	0	0	0	0	0	0

5.1.2 Night-time Receptor Noise Egress CalculationsVent-Axia Sentinel Kinetic MVHR Units Fresh Air Inlet

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Power Level	85	75	73	78	65	59	52	47	76
Sound Pressure Level at 1m from atmospheric termination	56	48	48	59	50	44	37	32	57
Distance Correction	-28	-28	-28	-28	-28	-28	-28	-28	
Directionality	0	0	0	0	0	0	-4	-7	
Quantity Correction (6No)	+8	+8	+8	+8	+8	+8	+8	+8	
Calculated Noise Level at Receptor	36	28	28	39	30	24	13	5	37

Vent-Axia Sentinel Integra Plus EC MVHR Units Exhaust

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Power Level	84	65	65	66	57	78	38	31	79
Sound Pressure Level at 1m from atmospheric termination	54	38	40	47	41	33	23	16	46
Distance Correction	-28	-28	-28	-28	-28	-28	-28	-28	
Directionality	0	0	0	0	0	0	-4	-7	
Quantity Correction (6No)	+8	+8	+8	+8	+8	+8	+8	+8	
Calculated Noise Level at Receptor	34	18	20	27	21	13	3	0	26



Vent-Axia Kinetic MVHR Units Fresh Air Inlet

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Power Level	39	43	45	47	43	36	29	31	
Sound Pressure Level at 1m from atmospheric termination	10	16	20	28	27	21	14	16	30
Distance Correction	-24	-24	-24	-24	-24	-24	-24	-24	
Directionality	0	0	0	0	0	0	-4	-7	
Quantity Correction (1No)	0	0	0	0	0	0	0	0	
Calculated Noise Level at Receptor	0	0	0	5	3	0	0	0	9

Vent-Axia Integra Plus EC MVHR Units Exhaust

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Power Level	47	42	39	40	36	28	28	33	
Sound Pressure Level at 1m from atmospheric termination	18	15	14	22	20	13	13	17	24
Distance Correction	-24	-24	-24	-24	-24	-24	-24	-24	
Directionality	0	0	0	0	0	0	-4	-7	
Quantity Correction (1No)	0	0	0	0	0	0	0	0	
Calculated Noise Level 0 Receptor	0	0	0	0	0	0	0	0	0

5.1.3 Cumulative Assessment

Description	Sound Pressure Level (dB)	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Vent-Axia Sentinel Kinetic MVHR Units Fresh Air Inlet	40	37
Vent-Axia Sentinel Integra Plus EC MVHR Units Exhaust	28	26
Vent-Axia Kinetic MVHR Units Fresh Air Inlet	0	0
Vent-Axia Integra Plus EC MVHR Units Exhaust	9	9
Cumulative Sound Pressure Level at Receptor	36	38
Plant Noise Limit	42	38
Compliance	✓	✓



Based on the above, it can be seen that the non-emergency operating plant items (MVHR units) are below the plant noise limits set and agreed as part of the planning decision for the scheme. Consequently, it is considered that the proposed building services plant are commensurate with the pre-commencement requirement of Planning Condition 7.

For and on behalf of

HANN TUCKER ASSOCIATES

Michael Hartley