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Architectural & Environmental Acousticians

Noise & Vibration Engineers

Discharge of Planning Condition 16

The Castings, Manchester

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Discharge of Planning Condition 16

Project: THE CASTINGS, MANCHESTER

Report reference: RP03-20728-R0

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Document control:

REVISION	ISSUE DATE	REPORT BY	CHECKED BY	NOTES
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1. INTRODUCTION

1.1 Cass Allen has been instructed by Midgard Ltd to assess the acoustic design of a new development at The Castings in Manchester.

1.2 The assessment has been carried out in accordance with the requirements of noise-related Planning Condition 16 which has been imposed on the development (Planning Application Reference No. 127317/FO/2020). The condition is:

> 16) Before the development commences a scheme for acoustically insulating and mechanically ventilating the residential accommodation against noise from adjacent roads and the adjacent tram and any mitigating vibration and reradiated noise levels associated with the operation of the adjacent tram line shall be submitted to and approved in writing by the City Council as local planning authority.
>
> The approved noise insulation scheme and vibration and reradiated noise mitigation measures shall be completed before any of the dwelling units are occupied.
>
> 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 LAmax,F by more than 15 times)
> Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq
> Gardens and terraces (daytime) 55 dB LAeq
>
> 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
>
> Prior to occupation a post completion report to verify that all of the recommended mitigation measures have been installed and effectively mitigate any potential adverse noise impacts in the residential accommodation shall be submitted and agreed in writing by the City Council as local planning authority. Prior to occupation any non compliance shall be suitably mitigated in accordance with an agreed scheme.
>
> Reason - To secure a reduction in noise in order to protect future residents from noise nuisance, pursuant to policies SP1, H1 and DM1 of the Core Strategy.

1.3 This report contains technical terminology; a glossary of terms can be found at www.cassallen.co.uk/glossary.

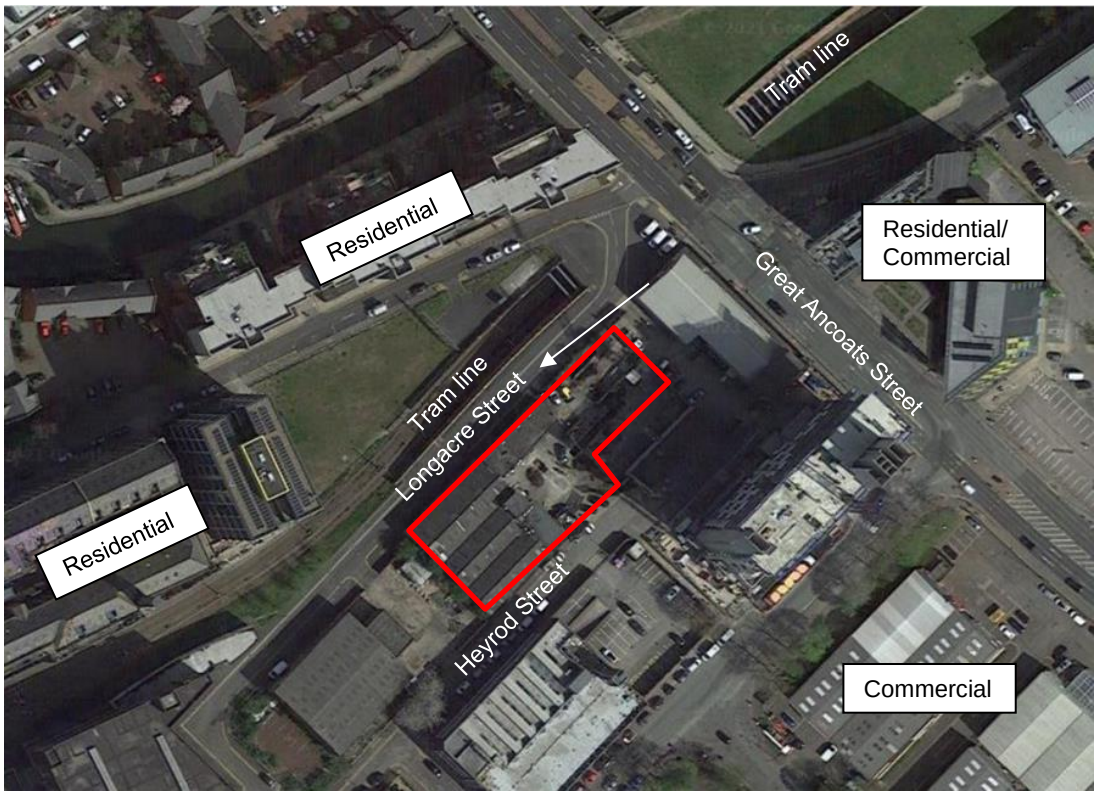
2. PROJECT DESCRIPTION

2.1 The development comprises commercial units at ground floor and mezzanine levels and residential to upper floors, including several communal amenity spaces. A current drawing of the development layout is shown in Appendix 1.

2.2 The site is located in a mixed-use area, bounded to the north by Longacre Street and to the south by Heyrod Street. To the north east of the site is Great Ancoats Street and to the north west of the site is a tram line. To the south of the site is the St James Catholic School.

2.3 The site location is shown in Figure 1 below.

Figure 1 Site Location and Surrounding Area



2.4 To address the requirements of Planning Condition 16, noise affecting the habitable areas of the development and the design of the external facades has been assessed.

3. NOISE AFFECTING THE DEVELOPMENT

3.1 The noise levels that will exist within the habitable areas of the finished development have been predicted based on the existing noise environment at the site and details for the design of the development. The predicted noise levels have then been compared with appropriate design criteria, as per Planning Condition 16. Suitable mitigation measures have been identified where necessary to achieve acceptable noise levels.

Design criteria – Internal noise levels

3.2 Planning Condition 16 requires that the internal noise levels of the development comply design criteria in line with BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'.

3.3 Relevant design criteria are summarised in Table 1 below.

Table 1 Internal Noise Criteria

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq,16hour	-
Dining	Dining room/area	40 dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour

3.4 Planning Condition 16 also states the design criteria for acceptable maximum noise levels in bedrooms from individual noise events shall not exceed 45dB LAFmax more than 15 times per night.

3.5 BS8233 also states that it is desirable that noise levels in external amenity areas of residential developments do not exceed 50 dB LAeq and that 55 dB LAeq,T should be regarded as a upper guideline value. This is reflected in the design criteria given in Planning Condition 16. BS8233 recognises however that these guideline values will not always be achievable in city centres or urban areas adjoining main roads or other transport sources. In these cases, BS8233 states that the development should be designed to achieve the lowest practical noise levels in the amenity spaces.

3.6 Planning Condition 16 also mentions "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". In this instance, there are no entertainment uses in close proximity to the development, therefore our assessment does not include these design criteria. With regard to entertainment noise within the development, this is addressed in Planning Condition 17 (ref: Cass Allen report LR01-20728-R1 dated 12th January 2023).

3.7 The following acoustic design criteria have therefore been adopted for the development:

- Average noise levels in living rooms and dining rooms during the day should not exceed 35 dB LAeq,0700-2300hrs and 40 dB LAeq,0700-2300hrs respectively;

- Average noise levels in bedrooms should not exceed 35 dB LAeq,0700-2300hrs during the day and 30 dB LAeq,2300-0700hrs during the night;
- Maximum noise levels should not regularly exceed 45 dB LAmax in bedrooms during the night;
- Where possible, average noise levels in external amenity areas during the day should be lower than 50-55 dB LAeq,0700-2300hrs.

Existing site noise levels

3.8 A noise survey was carried out at the site from 6th to 9th September 2021 to assess existing noise levels in the area. The full methodology and results of the noise survey are provided in Appendix 2.

3.9 Average noise levels (LAeq) across the site were dictated by road traffic on Great Ancoats Street.

3.10 Maximum noise levels (LAmax) at the site were dictated by vehicle movements on Great Ancoats Street and tram passes.

3.11 Background noise levels (LA90) across the site were dictated by constant road traffic noise from surrounding roads.

3.12 Areas of the development at the eastern edges of the site will be subject to the highest noise levels due to road traffic from Great Ancoats Street and tram passes. The noise survey results show that noise levels at this position are as follows:

- Average noise levels during the daytime - 61 dB LAeq,0700-2300hrs;
- Average noise levels during the night-time - 56 dB LAeq,2300-0700hrs;
- Typical maximum noise levels during the night-time - 69 dB LAmax.

3.13 The above night-time LAmax has been corrected to exclude noise associated with a nearby loose manhole cover.

3.14 Based on the results of the site noise survey, a 3D computer noise model was developed to predict and assess the noise levels that will exist across the entire development.

3.15 The 3D noise model was developed using Cadna/A v2021 environmental noise modelling software. Cadna/A incorporates the calculation methodology outlined in the Department of Transport Welsh Office - *Calculation of Road Traffic Noise* (CRTN) for the assessment of road traffic noise propagation.

3.16 The layout of the development and surrounding area was input into the model. To calculate the spread of noise levels around the site, day-time average noise levels were input for the surrounding sources (e.g. Great Ancoats Street and the tram line) and calibrated to the results of the on-site noise measurements.

3.17 The methodology and results of the noise modelling are provided in Appendix 3. It can be seen from the modelling results that noise levels will be highest on facades of the development facing

Great Ancoats Street and the tram line and noise levels will be lowest on facades at the south of the site.

Internal noise levels in noise-sensitive rooms

3.18 The external walls of the development will be constructed using one of the two constructions:

- A masonry construction comprising 102mm brick, 173 - 282mm cavity filled with 90mm Rockwool Rainscreen Duo insulation, 12mm sheathing board (Siniat or similar), Steel Frame System (SFS) forming a 100mm cavity fully-filled with 100mm mineral wool, 2 layers of 12.5mm wallboard. The sound insulation performance of this build up has been predicted to be >70 dB Rw + Ctr using INSUL 9.0.22, consequently, noise ingress via the facade will be dictated by the sound insulation performance of the glazing.

- A cladding construction comprising 2mm aluminium cladding, 275mm cavity filled with 150mm Rockwool Rainscreen Duo insulation, 12mm sheathing board (Siniat or similar), Steel Frame System (SFS) forming a 100mm cavity fully-filled with 100mm mineral wool, 2 layers of 12.5mm wallboard. The sound insulation performance of this build up has been predicted to be 58 dB Rw + Ctr using INSUL 9.0.22, consequently, noise ingress via the facade will be dictated by the sound insulation performance of the glazing.

3.19 The ventilation scheme for the project is Mechanical Ventilation with Heat Recovery (MVHR) i.e. System 4 from Building Regulations Part F. Therefore, there will be no background ventilators in the external facades (e.g. trickle ventilators etc).

3.20 The MVHR system has been selected to ensure that noise from air supply and extract ductwork does not exceed acceptable levels within habitable rooms. Appropriate specifications for noise levels from the MVHR system (operating at typical maximum duty) are be as follows:

- Bedrooms and living rooms – 30 dB LAeq,T at 1.5m from any ventilation aperture; and,
- Other habitable areas – 35 dB LAeq,T at 1.5m from any ventilation aperture.

3.21 A typical MVHR layout is shown in Appendix 4. This is considered worst-case in terms of noise levels. Each apartment has a single MVHR unit (Vent-Axia Lo-Carbon Sentinel Kinetic Advance Model S), the specifications of this unit are shown in Appendix 4.The MVHR unit will be supplying 29 litres/sec in 'boost' mode with a pressure of around 100Pa. This equates to duty (or speed) of just over 40% with reference to page 3 of the Vent-Axia specification shown in Appendix 4. Therefore the following noise emissions for the Vent-Axia unit have been taken as those shown in Table 2 below.

Table 2 Noise emissions for MVHR Unit

Mode	Octave Band Sound Power Levels/dB									SPL @ 3m
	63	125	250	500	1000	2000	4000	8000	LwA	
Supply	59.5	56.5	59.4	55	48.2	42.6	31.8	26.1	55.9	38.4
Extract	51.9	51.3	50.4	41.2	35	25.3	19.8	25.4	44.8	27.3
Breakout	40.2	42.6	46.5	45.4	41	36.2	25.5	25.3	46.5	26

3.22 Attenuators are also specified on the supply and return air inputs and the fresh and exhaust air outputs. The specification of the attenuators is shown in Table 3 below.

Table 3 Insertion Loss of Ductwork Attenuators /dB

	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Supply air								
Return Air								
Fresh Air	2	5	11	24	46	42	36	22
Exhaust Air								

3.23 Noise levels in habitable rooms due to MVHR noise have been calculated to be below 30dB LAeq,T, therefore they are compliant with the criteria in section 3.20. In addition, external noise break-in from the fresh and exhaust ducts that terminate at the façade are also below 30 dB, LAeq,T, this assumes a 200mm x 60mm grille on the façade, an attenuator as per the specification in Table 3 above and a 12.5mm wallboard ceiling.

3.24 Calculations were carried out using facade modelling software in accordance with the “more rigorous” methodology given in BS8233:2014 to establish the sound insulation performance required of the glazing and ventilation to achieve the nominated internal noise criteria in the ‘worst-case’ habitable rooms of the development (i.e. the habitable rooms that will be subject to the highest external noise levels). The calculations included a 3 dBA design margin.

3.25 The calculations were carried out based on the dimensions/details for facade elements taken from project drawings.

3.26 The results of the calculations are shown in Appendix 5 and are summarised in Table 4 below.

Table 4 Acoustic Requirements for Habitable Rooms

Rooms	Glazing Performance Requirements (inc. Frames)	Ventilator Performance Requirements (in Open Position)
Habitable rooms on northern and eastern facades	30 dB Rw+Ctr	MVHR
Habitable rooms on southern and western facades	27 dB Rw+Ctr	MVHR

3.27 The required sound insulation performance values in Table 4 could typically be achieved by the glazing types shown in Table 5.

Table 5 Typical Glazing Acoustic Performances

Glazing (in Good Quality Sealed Frames)	Typical Weighted Sound Reduction (Rw + Ctr)
4/16/4mm standard thermal double glazing	27
6/16/6.4mm thermal double glazing	30

3.28 Based on the results of the calculations summarised in Table 4 and the measured noise levels at the site (considering both the day and night-time average and maximum noise levels), a specification has been developed showing the sound insulation performance requirements for all facades of the development. The facade specification is shown in Appendix 6.

3.29 It can be seen from the above that the project criteria is predicted to be achieved via the selection of glazing and ventilation systems as given in Appendix 6.

Noise levels in external amenity areas

3.30 The design of the development has also been reviewed in relation to the BS8233 recommendation that noise levels in external amenity areas should ideally not exceed 50 – 55 dB LAeq,T.

3.31 Based on the results of the noise survey, noise levels on external amenity area on the north western facade are predicted to achieve below 55dB LAeq,T. The eastern side is expected to exceed the BS8233 recommended levels by 1-2dB. However, whilst this is not ideal, in our view, exceeding the BS8233 recommended levels does not normally mean that the communal external amenity areas would be unacceptable to future residents. The reasons for this are as follows:

- Most developments in urban areas will be subject to noise levels above the BS8233 recommended levels for balconies[1].

[1] Table 2 from BS8233 notes that daytime noise levels will typically exceed 50-55 dB LAeq,16hr in areas close to busy main roads. It was also found in the UK National Noise Incidence Study 2000/2001 that 90% of UK homes were exposed to daytime noise levels >50dB LAeq,16hr and 54% of UK homes were exposed to noise >55dB LAeq,16hr. It is reasonable to assume that a high percentage of these were in urban areas.

- It is common for noise levels in external amenity areas facing main roads to exceed the BS8233 recommended noise levels in Manchester and elsewhere; and
- It is reasonable to assume that residents would prefer the option to have a noisier external amenity area as opposed to having no amenity area at all.

The current design of the development is therefore considered to be acceptable in relation to noise levels in external amenity areas.

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4. CONCLUSIONS

4.1 Cass Allen was instructed by Midgard Ltd to assess the acoustic design of the development as required by Planning Condition 16.

4.2 Noise levels on external amenity area on the north western facade are predicted to achieve below 55dB LAeq,T. The eastern side is expected to have a small 1-2dB exceedance of the recommended levels, however, in our view this exceedance is acceptable as detailed in Paragraph 3.30 of this report.

4.3 Internal noise levels compliant with the requirements of Planning Condition 16 have been calculated to be achievable within all habitable rooms of the development using the glazing and ventilation strategies set out within this report.

4.4 It is our view the design of the development is consider to be compliant with the requirements of Planning Condition 16.

Appendix 1 Development Layout

Appendix 2 Survey Results

Survey Summary:

The survey comprised short-term operator attended noise measurements and longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads and noise from tram passes on the nearby tram line.

Survey Period:

06/09/2021 to 09/09/2021

Survey Objectives:

- To identify noise sources that contribute to ambient noise levels at the site;
- To measure noise levels around the site over a typical day and night-time period.

Equipment Used:

Type	Manufacturer	Model	Serial Number
Sound level meter[1]	NTi Audio	XL2	A2A-15506-E0
Calibrator	NTi Audio	600 000 388	15011
Sound level meter[1] (noise logger)	Rion	NL-32	00272007
Sound level meter[1] (noise logger)	Rion	NL-32	01213688
Calibrator	Rion	NC-74	34551703

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

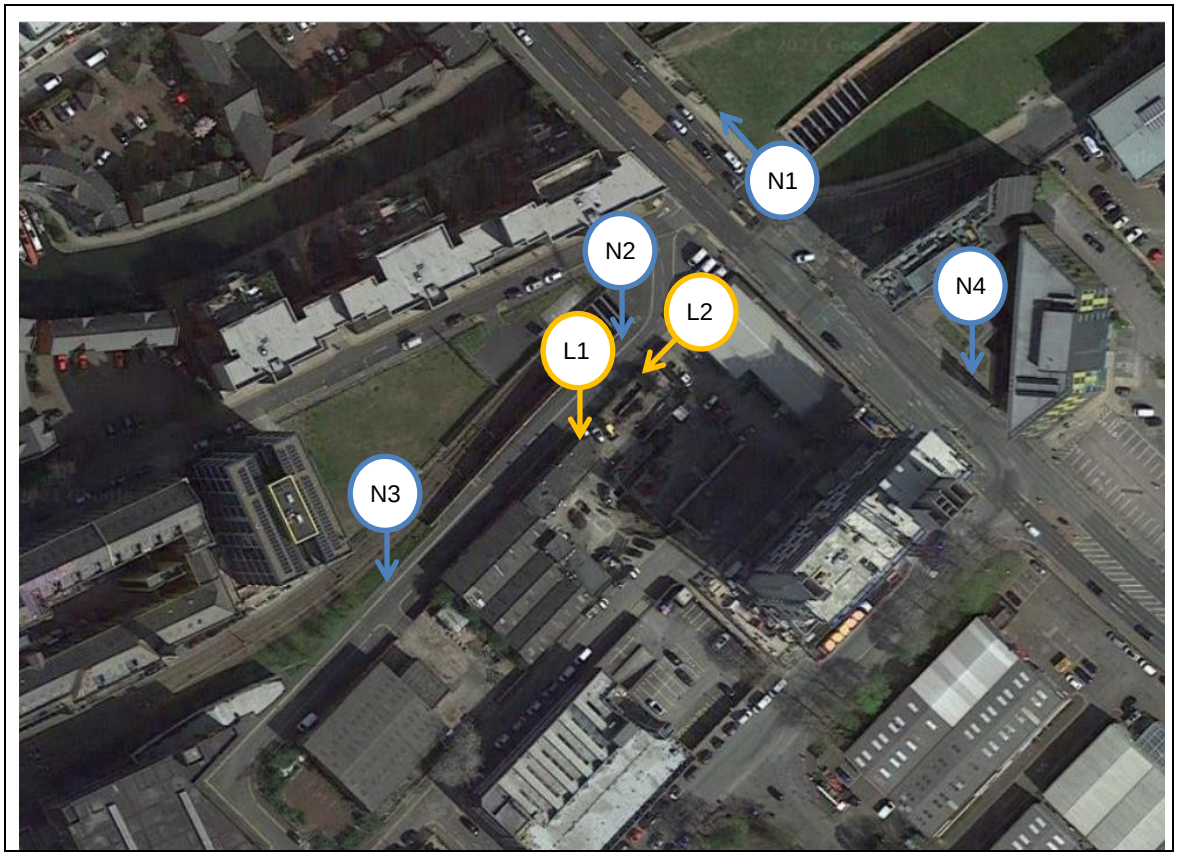
Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring.

Measurement Positions:

Position (refer plan below)	Description
N1	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Great Ancoats Street.
N2	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Great Ancoats Street and Longacre Street.
N3	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to tram line, Longacre Street and Great Ancoats Street.
N4	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Great Ancoats Street.
L1	Unattended noise logging position. 6.5m above ground level. Free-field. Direct line of sight to Great Ancoats Street and tram line.
L2	Unattended noise logging position. 4m above ground level. Free-field. Direct line of sight to Great Ancoats Street.

Site Plan showing Measurement Positions:



Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	Observations
06/09/2021	N1	14:12	7 secs	69	71	Noise dictated by road traffic from Great Ancoats Street, stop start traffic due to light sequence and positioning. Loose manhole cover considerable clatter when driven over, occasional construction works noticeable in periods of no traffic movement. Maximum levels generally HGV passes and loud car exhausts.
		14:15	5 mins	68	80	
		14:20		71	93	
		14:26	13 secs	72	80	
		14:26	11 secs	68	71	Noise dictated by road traffic from Great Ancoats Street, cars and vans.
		14:26	7 secs	71	75	
	N2	14:30	34 secs	55	68	Noise dictated by road traffic from Great Ancoats Street, loose manhole cover considerable clatter when driven over, occasional construction works noticeable.
		14:50	5 mins	62	83	Noise dictated by road traffic from Great Ancoats Street, loose manhole cover, occasional construction works, single tram pass.
		14:55		60	81	
	N3	15:04	9 secs	62	70	Noise dictated by car pass on Longacre Street.
		15:04	7 secs	70	78	Noise dictated by car pass on Longacre Street.

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	Observations
		15:05		66	71	Noise dictated van pass on Longacre Street.
		15:06	20 secs	68	76	Noise dictated by tram pass; nearside, short measurement due to construction noise opposite starting.
		15:08	29 secs	67	77	Noise dictated by tram pass, far side.
		15:20	17 secs	67	74	
		15:29	20 secs	64	74	
		15:30	22 secs	70	77	Noise dictated by tram pass, nearside.
	N4	15:40	5 mins	72	82	Noise dictated by road traffic from Great Ancoats Street, maximum levels from HGV passes, occasional construction works noticeable in periods of no traffic movement
		15:45		72	84	
		15:50	7 secs	73	76	Noise dictated by road traffic on Great Ancoats Street.
		15:50	12 secs	74	77	
	N1	16:30	5 mins	67	80	Noise dictated by road traffic from Great Ancoats Street, maximum levels from HGV passes.
		16:35		69	80	Noise dictated by road traffic from Great Ancoats Street, maximum levels from HGV passes, stationary bus for part of measurement increased LAeq levels.

Unattended Noise Monitoring Results:

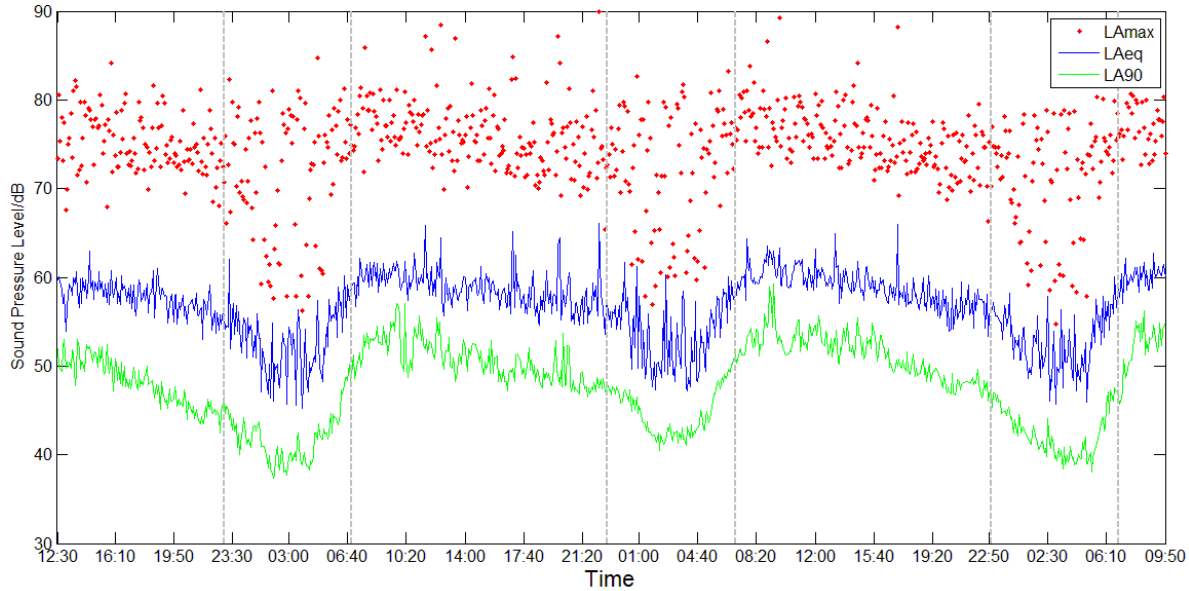
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB[1]	LAeq,8hr, dB	LA90,5mins, dB[1]	LAmax, dB[2]
06/09/2021 to 09/09/2021	L1	59	52	55	42	78-79
	L2	61	53	56	42	82-83

Note 1: Typical lowest measured during the period shown.

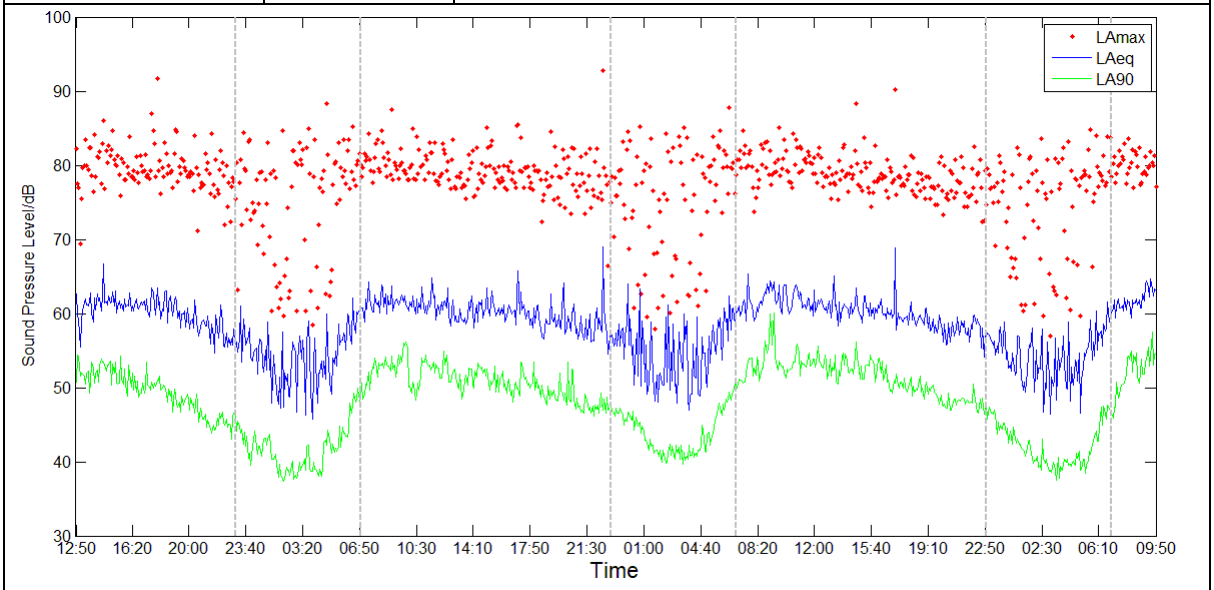
Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

Unattended Noise Monitoring Results:

Meas. Period	Position
06/09/2021 to 09/09/2021	L1



Meas. Period	Position
06/09/2021 to 09/09/2021	L2

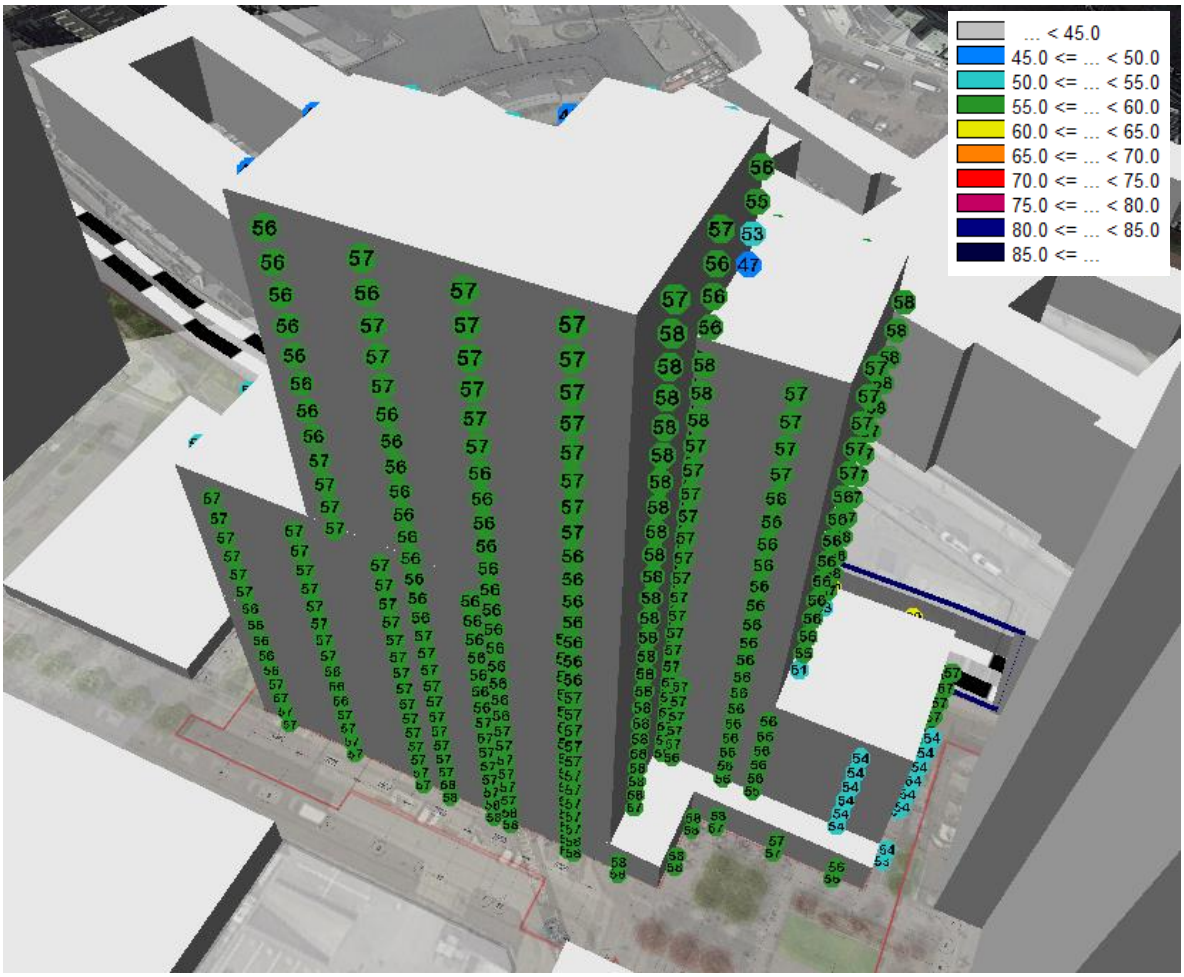


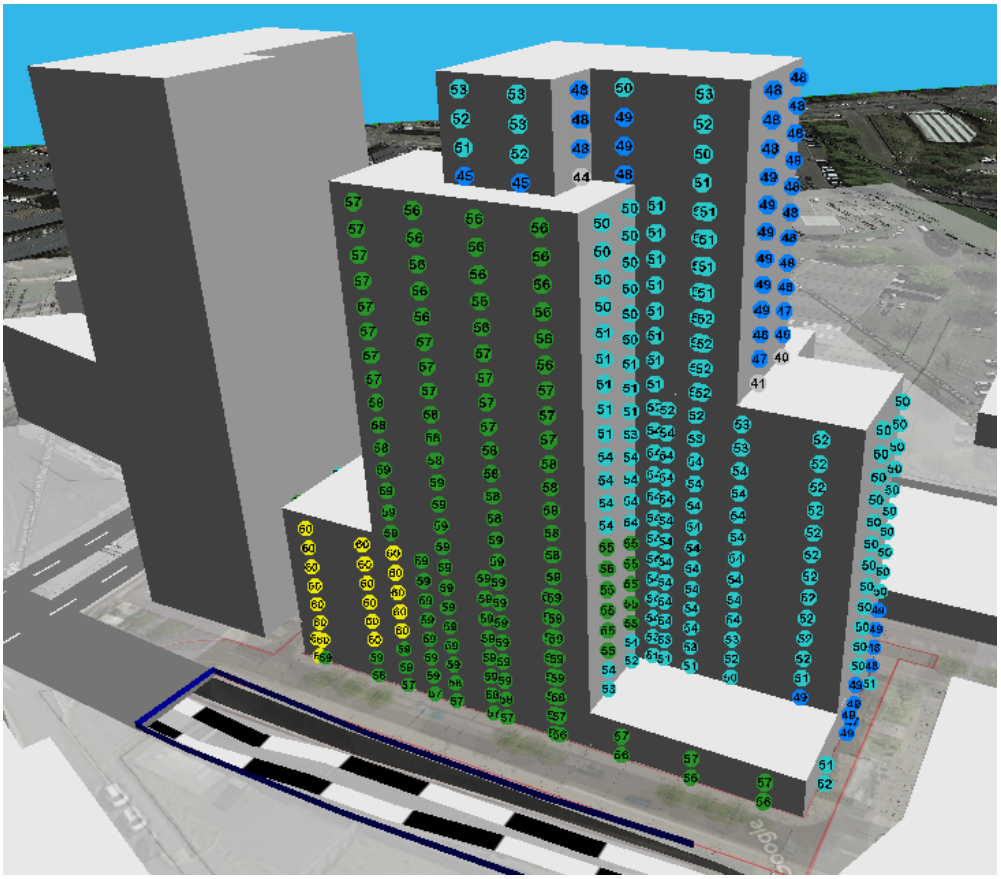
Appendix 3 Modelling Results

Modelling Software:	CADNA/A Version 2021
Modelled Scenarios	Day and night-time average noise levels across the site
Data inputs:	• Noise survey results • Topographical data for the site • Development layout
Calculation Algorithms Used:	• Calculation of Road Traffic Noise 1988 – Department of Transport • ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere • ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation

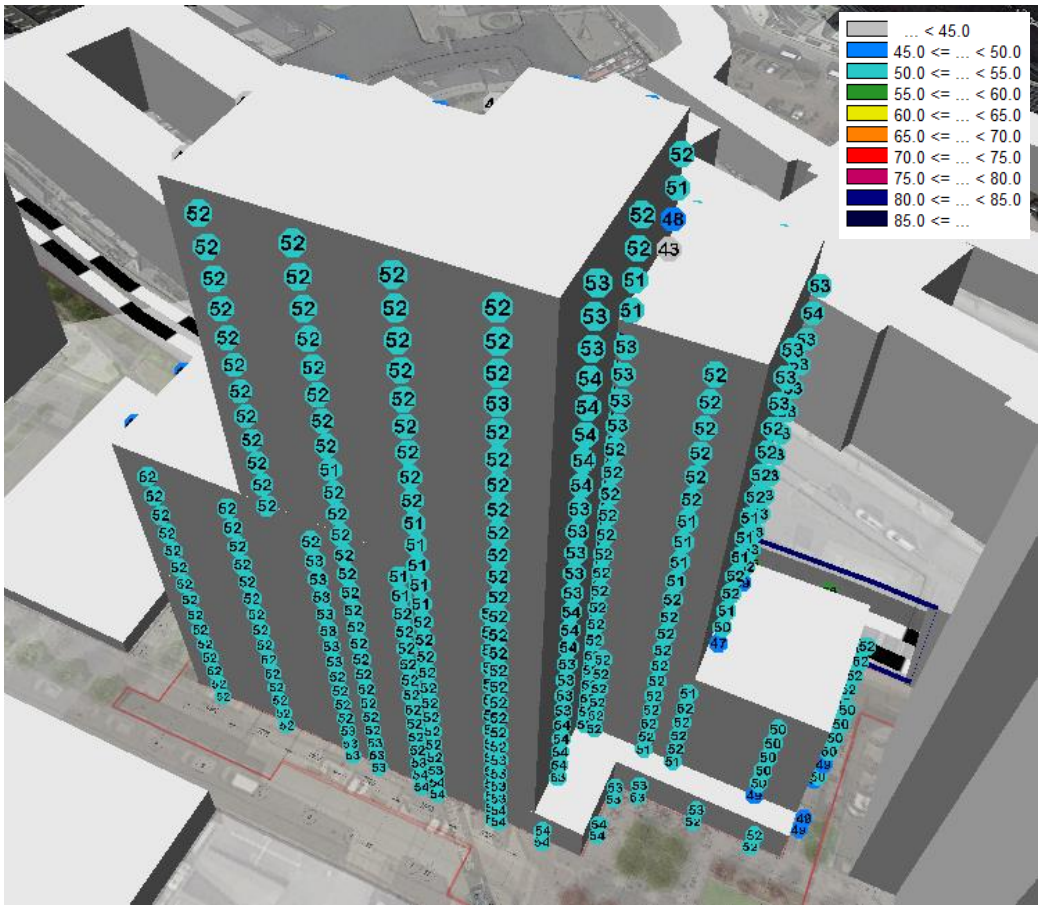
Modelling Printout:

Scenario	Daytime noise levels (LAeq,16hr) at 1.5m above ground level

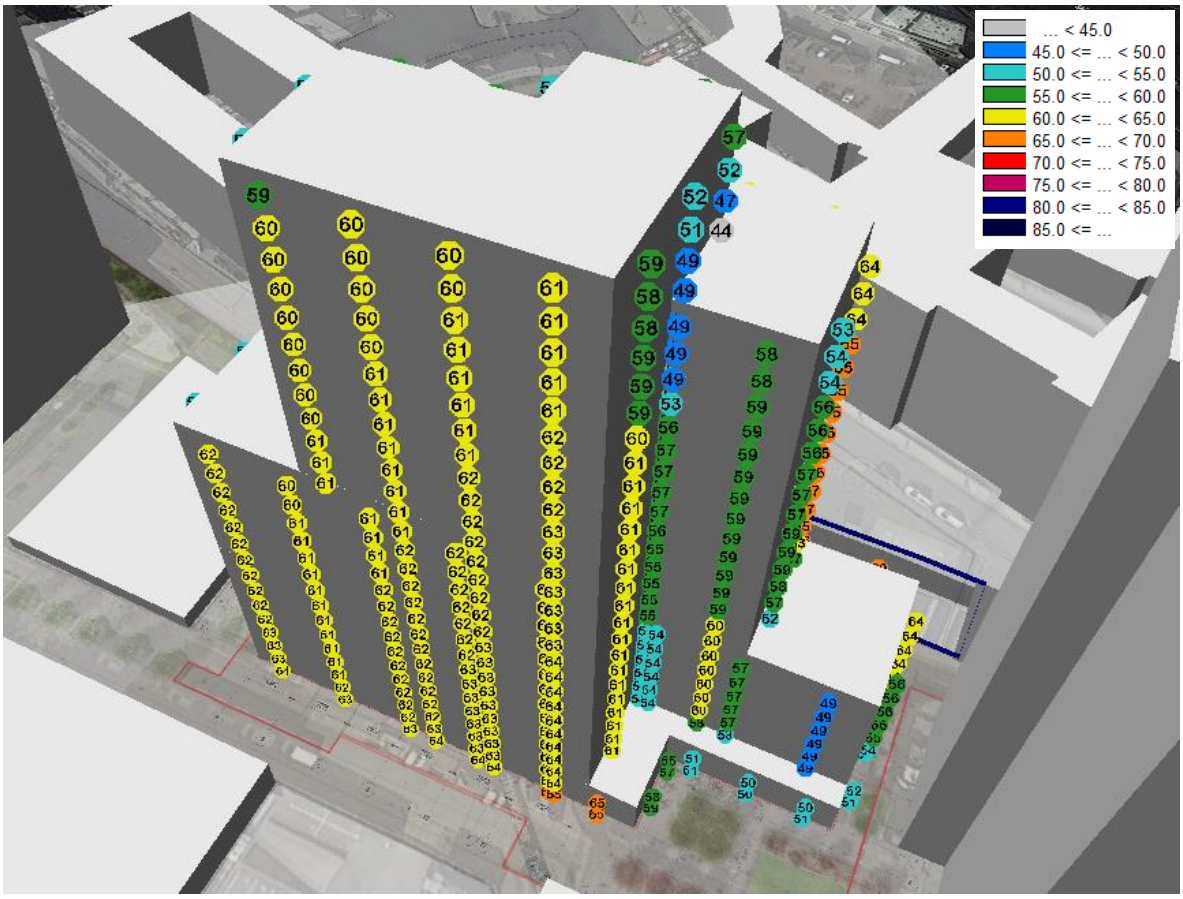


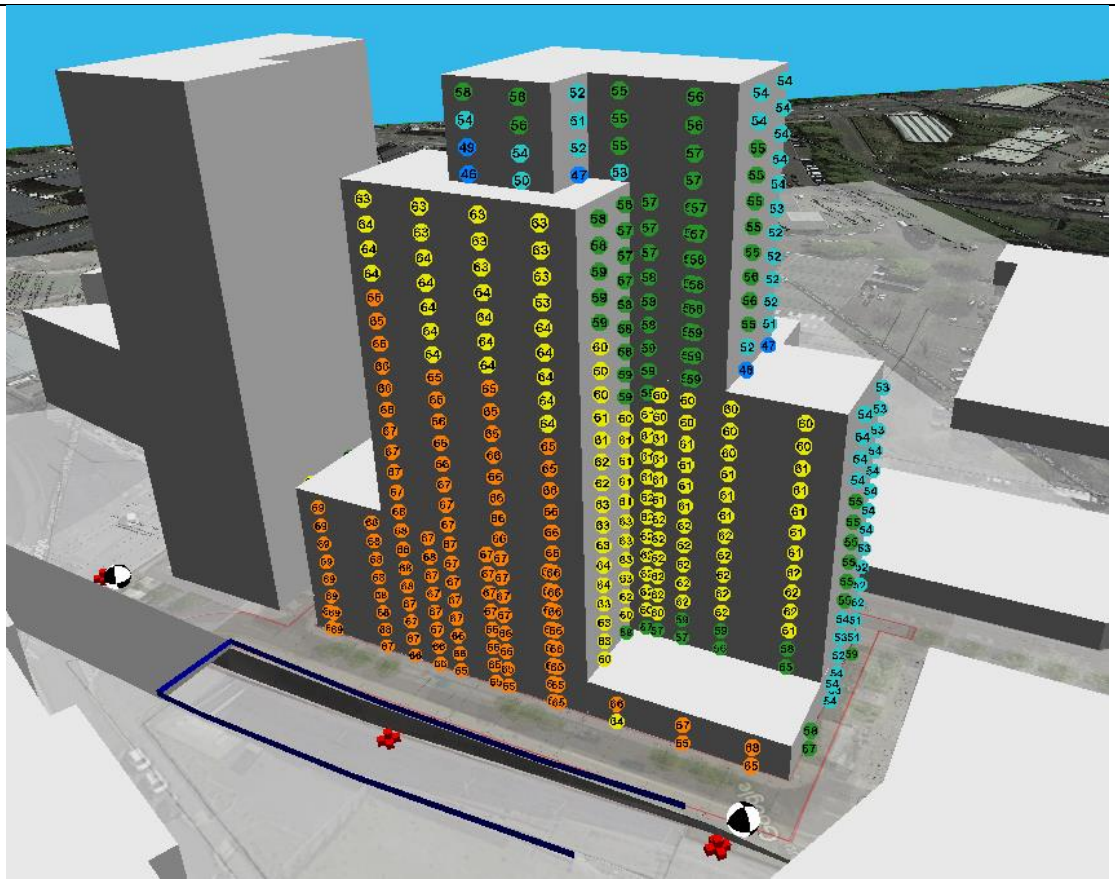


Scenario	Night-time noise levels (LAeq,8hr) at 1.5m above ground level



Scenario	Night-time noise levels (LAmax) at 1.5m above ground level





Appendix 4 MVHR Details and Duct layouts

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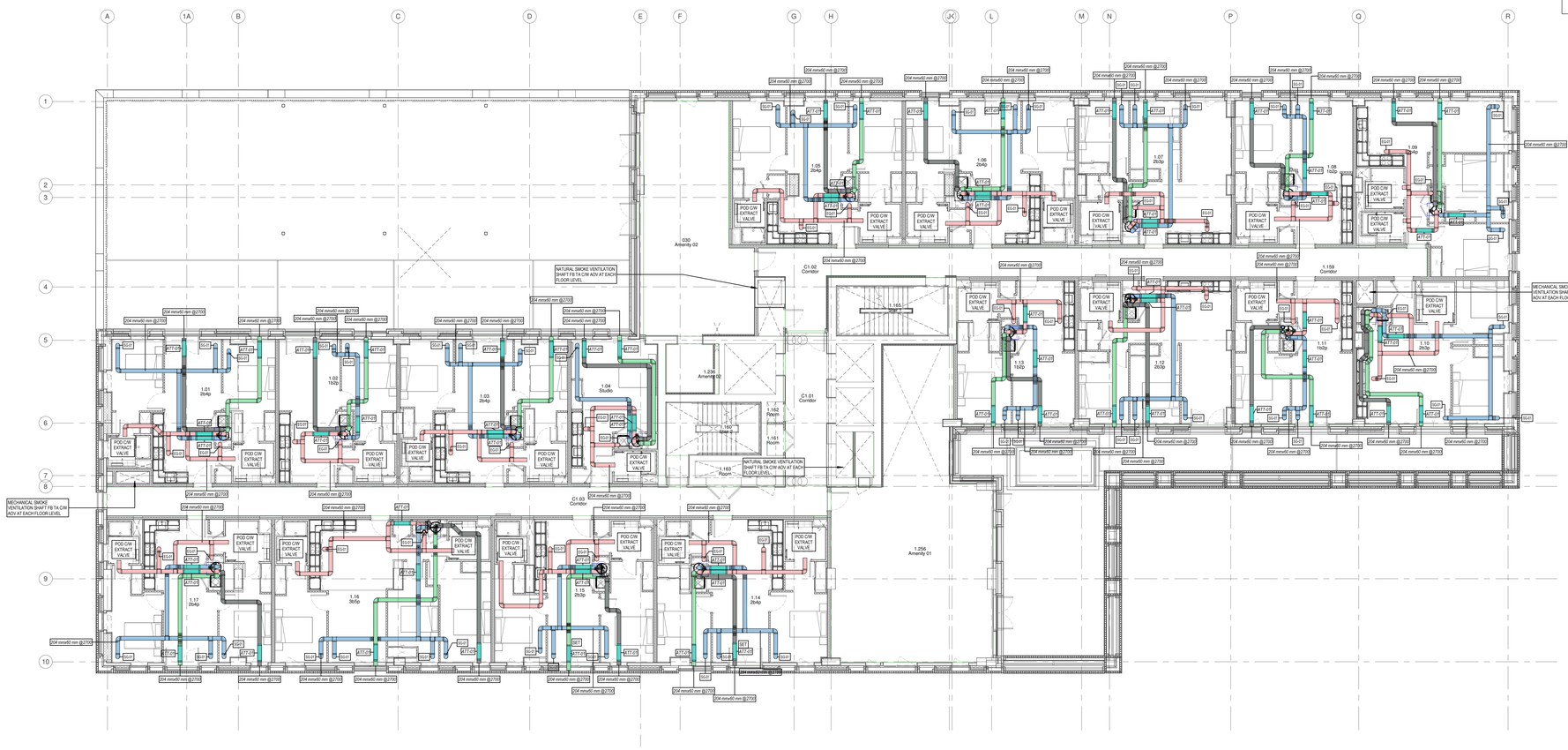
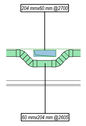


1 Level 01 - Ventilation
1 : 100



2 Crossover - Level 01
1 : 20

DUCTWORK RUNNING TO EXTERNAL FACADE TO HAVE AVOUSTIC INSULATION BETWEEN ATTENUATOR AND PLENUM

Level 01 - Attenuator Schedule			
ABE_Equipment Reference Number	Manufacturer	Model Type	Count
ATT-01	Attaway Acoustics	SL - GRRTS	68

Level 01 - Supply Air Terminal Schedule			
ABE_Equipment Reference Number	Size	Type	Count
SG-01	125 mmø	AirTerminal_ABE_125-CircularAirValve-Supply	46

Level 01 - Extract Air Terminal Schedule			
ABE_Equipment Reference Number	Size	Type	Count
EG-01	125 mmø	AirTerminal_ABE_125-CircularAirValve-Return	53

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REVISION	ITEM REVISED	DATE
P01	PRELIMINARY ISSUE	09.12.21
P02	PRELIMINARY ISSUE	28.01.22
C01	CONSTRUCTION ISSUE	23.03.22

NOTES

VENTILATION NOTES

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2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS / DOCUMENTS / SCOPE OF WORKS AND SPECIFICATIONS. THIS DRAWING SHOULD ONLY BE USED FOR ITS INTENDED PURPOSE.

3. BEFORE COMMENCEMENT OF WORK ASSOCIATED WITH THIS DRAWING REFER TO THE APPROPRIATE METHOD STATEMENTS AND RISK ASSESSMENTS.

4. ALL DUCTWORK SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH DW/144 AND CIBSE COMMISSIONING CODES.

5. ALL DUCTWORK TO BE SUPPORTED IN ACCORDANCE WITH DW/144 ARRANGEMENT OF BEARERS AND HANGERS.

6. ACCESS PANELS TO BE PROVIDED ADJACENT TO ALL FIRE DAMPERS ON BOTH SIDE UNLESS EQUIPMENT CLARIFICATION.

7. INSPECTION PANELS TO BE PROVIDED ADJACENT TO ALL VOLUME CONTROL DAMPERS AND VCD'S AND AT LEAST EVERY 9M FOR FUTURE MAINTENANCE AND CLEANING.

8. FOR LOCATIONS OF ACCESS PANELS FOR INSPECTION / SERVICING AND OR CLEANING REFER TO TABLE 20.07 THE DW/144 INTERNAL.

9. ALL ACCESS/INSPECTION HATCHES ARE TO BE PROPRIETARY MANUFACTURED WITH QUICK RELEASE CATCHES AND SELF SEALING GASKETS.

10. ALL ACCESS/INSPECTION PANELS SHALL REMAIN ACCESSIBLE. THE INSULATION CONTRACTOR SHALL SUITABLY DRESS THE EDGES OF THE INSULATION TO THE EDGE OF THE ACCESS OPENING.

11. THE USE OF FLEXIBLE DUCTWORK SHALL BE LIMITED TO 250mm IN LENGTH TO MAKE FINAL CONNECTIONS ONLY.

12. DUCTWORK SHALL BE MANUFACTURED WITH GRADUAL TRANSFORMATIONS AND CHANGES OF SHAPE/DIRECTION.

13. TURNING VANES SHALL BE INSTALLED IN ALL RECTANGULAR SECTION DUCTWORK AT ALL CHANGES IN DIRECTION.

14. FLEXIBLE CONNECTIONS SHALL BE INCORPORATED WITHIN THE DUCTWORK SYSTEM TO ISOLATE THE DUCTWORK DISTRIBUTION SYSTEM FROM VIBRATION PRODUCING EQUIPMENT.

15. GRILLES AND DIFFUSERS SHALL BE PROVIDED WITH THE MANUFACTURERS PURPOSE MADE PLENUM BOX (SIDE OR TOP ENTRY SPIGOT AS NECESSARY) WHERE INDICATED.

16. ALL GRILLES AND DIFFUSERS SHALL HAVE A FINISH/COLOUR TO SUIT THE ARCHITECTS REQUIREMENTS.

17. ALL AIR DISTRIBUTION DUCTS PASSING THROUGH ELEMENTS OF STRUCTURE FORMING FIRE COMPARTMENTS SHALL INCORPORATE A FIRE DAMPER. THE FIRE DAMPER ARRANGEMENT INCLUDING SUITABLE H/CA INSTALLATION FRAME (IF APPLICABLE), SHALL HAVE A FIRE RESISTANCE RATING EQUAL TO THE ELEMENT WHICH IT PENETRATES.

18. ALL BRANCHES FROM THE MAIN DISTRIBUTION DUCTS SHALL BE BY A SHOE-BRANCH FITTING.

19. FUSIBLE LINK FIRE DAMPERS TO BE PROVIDED WHERE DUCTS PASS THROUGH CAVITY BARRIERS / FIRE COMPARTMENTATION IN COMPLIANCE WITH THE FIRE ENGINEERS REPORT.

LEGEND

EF	- EXTRATCT FAN
HRU	- HEAT RECOVERY UNIT
SG	- SUPPLY GRILLE
EG	- EXTRACT GRILLE
RG	- RETURNS GRILLE
FD	- FIRE DAMPER
VAV	- VARIABLE AIR VOLUME
HB	- HEATER BATTERY
VCD	- VOLUME CONTROL DAMPER
ATT	- ATTENUATOR
TG	- TRANSFER GRILLE
DT	- DOOR TRANSFER GRILLE
SV	- SMOKE VENT
AOV	- AUTOMATIC OPENING VENT

- 204 x 60 mm SUPPLY AIR
- 204 x 60 mm RETURN AIR
- 204 x 60 mm FRESH AIR - C/W INSULATION
- 204 x 60 mm EXHAUST AIR - C/W INSULATION

CONSTRUCTION

CLIENT
JRL MIDGARD

ARCHITECT
AXIS ARCHITECTS

CONTRACT
THE CASTINGS

TITLE
Mechanical Services - Ventilation Services - First Floor

DRAWN	CHECKED	SCALE
DM	PW	As indicated@A0

DATE	DRAWING No	REV
10.03.22	CAS-ABE-BU1-L01-DR-M-57-0001	C01

abengineering
Holly Terrace • 9-17 Derby Lane
Old Swan • Liverpool • L13 6QA
tel: 0151 228 4661 • fax: 0151 220 4206
email: info@abeng.co.uk • website:
www.abeng.co.uk

PROJECT NAME: THE CASTINGS
DATE: 15/09/2021

PROJECT No: 81603
SCHEDULE No: 15081603Q1

Item	System Reference	Code	Suffix	DWG	L1	L2/ID	W	H/Dia	Vol	PD	Wt	No.		Performance, dB							
					mm	mm	mm	mm	m^3/s	Pa	kg	Off.		63	125	250	500	1k	2k	4k	8k
1	MVHR FRESH AIR	SL	GR6TS	A07G	900		204	120	0.029	20	12	352	IL	2	5	11	24	46	42	36	22
2	MVHR SUPPLY AIR	SL	GR6TS	A07G	900		204	120	0.029	20	12	352	IL	2	5	11	24	46	42	36	22
3	MVHR EXTRACT AIR	SL	GR6TS	A07G	900		204	120	0.029	20	12	352	IL	2	5	11	24	46	42	36	22
4	MVHR EXHAUST AIR	SL	GR6TS	A07G	900		204	120	0.029	20	12	352	IL	2	5	11	24	46	42	36	22

NOTES

LABEL WITH ITEM NO. & SYSTEM REF.

IL = STATIC INSERTION LOSS (dB)

TS - TOP SPIGOT.
G - SELF FINISH PRE-GALVANISED STEEL CONSTRUCTION.

ALLAWAY ACOUSTICS Old Police Station, 1 Queens Road, Hertford SG14 1EN
T 01992 550825 E enquiries@allawayacoustics.co.uk W allawayacoustics.co.uk
Registered in England No. 958950. Registered office: 1 Queens Road, Hertford SG14 1EN

Lo-Carbon Sentinel Kinetic Advance

- Touch screen controller
- Lightweight for easier installation
- Full summer bypass
- Wi-Fi connectivity option
- Wireless commissioning
- Pre-commissioning via USB
- App control option
- Left/Right handing through the controller
- Pre-heater option for cold climates
- Post-heater control option
- Developed and manufactured in the UK
- ISO ePM10 and ePM2.5 filter options
- Acoustic Enclosure option for reduced breakout noise
- Acoustic Top Box option for reduced in-duct noise

CIBSE BUILDING PERFORMANCE AWARDS 2017 WINNER

H&V news AWARDS 2017 WINNERS

The award winning Sentinel Kinetic® Advance from Vent-Axia is the next generation of heat recovery ventilation systems. It is designed to offer the highest level of comfort and control available ensuring the best possible customer experience.

A whole new experience

The highly sculpted interior surfaces, designed using the latest CFD techniques, ensures airflows are maximised through the unit, minimising noise and energy use. This feature alone provides an experience which we are confident will delight home owners and fulfil our ambition of providing the most discrete and efficient ventilation available.

With the widest range of options available, installers can now order a system that is tailored to their client's needs.

Air Quality and Health

We have strived to make the Advance system the most flexible solution available on the market. Optimisation has been targeted in every aspect of the design to ensure that it really does improve quality of life. Whatever the outside environment, we a have a method to help reduce air pollution from entering the living space. Our range of filter options, up to and including ePM2.5 (F7), ensures that even homes in heavily urbanised areas have the opportunity to filter out the impurities and help protect their family from respiratory issues.

Low noise levels

The most common concern with home owners is that ventilation devices create noise. With Advance, absolute optimisation of every element does everything possible to minimise generation and transmission of both motor and airflow noise. We believe that we have one of the quietest units available. The Sentinel Kinetic Advance Acoustic Solution is also available for scenarios where noise is critical; an Acoustic Enclosure will reduce breakout noise and the Top Box will reduce in-duct noise at key frequencies.

Ventilation how you want it

We have spent our time considering every element of the ventilation control. Should you want to run the system at certain times and at certain speeds, all of the options are available for you. With a programmable controller, it is possible to boost the unit if required, for example during hot periods in the summer, or even reduce the speed if needed, perhaps when a baby is due to go to bed. Whatever the situation, Advance can be made to operate as needed.

At the same time, automatic functions such as frost protection and summer bypass even have a choice of algorithms designed to suit different climates and lifestyles.

Controllability

With building services often hidden away in cupboards or in lofts we have developed a number of options for system control. From an App which provides instant access wherever you are, to full on-board touch screen controls, an option will be available to suit your needs.

Download on the App Store | GET IT ON Google Play

Airtight Buildings

Low energy buildings typically have very low leakage rates (below $3m^3/(h.m^2)$ at 50Pa). This reduces the effectiveness of the standard frost protection strategy which imbalances the airflows. For airtight buildings in cold climates it is advisable to use the Sp models with built-in pre-heater.

SEC Class

Model	SEC Class
Advance S/SX	A+

Vent-Axia

Model

Model	Stock Ref
Advance S	405215
Advance S with Acoustic Top Box & Enclosure	479550
Advance S with Acoustic Top Box	479549
Advance S with Acoustic Enclosure	479548
Advance SX	405216
Advance SX with Acoustic Top Box & Enclosure	479553
Advance SX with Acoustic Top Box	479552
Advance SX with Acoustic Enclosure	479551
Advance Sp LH	476808
Advance Sp RH	476809

Accessories

Model	Stock Ref
Wifi Controller	409195
Docking Kit for Wired Controller	474491
Volt-free Expansion (Four additional inputs)	472697
Switched Live Expansion (Two additional inputs)	472699
0V - 10V Input Board (Two inputs)	472701
Acoustic Purge Fan	477988

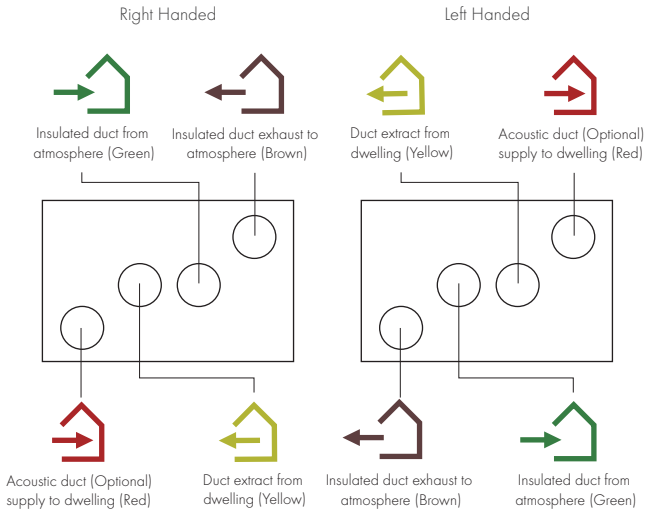
Spare Filters

Model	Stock Ref
ISO 45% Coarse (G3) (2 pack)	472667
ISO ePM10 50% (M5) Pollen Filter (1 pack)	472669
ISO ePM2.5 70% (F7) (1 Pack)	472671

SAP PCDB Test Results

	SAP 2009		SAP 2012	
	Thermal Efficiency %	SFP (W/l/s)	Thermal Efficiency %	SFP (W/l/s)
K+1	93	0.38	93	0.39
K+2	93	0.38	92	0.46
K+3	92	0.42	91	0.55
K+4	92	0.50	91	0.70
K+5	91	0.58	90	0.85
K+6	91	0.68	89	1.07
K+7	90	0.82	89	1.31

Spigot Configuration



Hand-able through controller (except if pre-heater fitted)

Model Range Overview

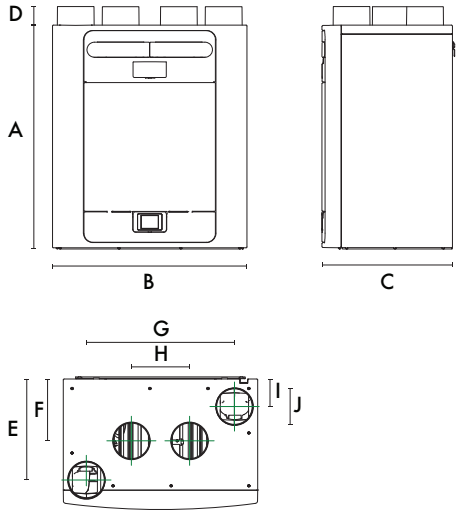
Models	Advance S	Advance SX	Advance Sp
Acoustic Enclosure	O	O	X
Acoustic Top Box	O	O	X
Sentinel Touch Screen Controller	✓	✓	✓
App Control	O	✓	O
App Commissioning	O	✓	O
Auto Summer Bypass	✓	✓	✓
Easy Access Filters	✓	✓	✓
ISO 45% Coarse (G3) Filter	✓	✓	✓
ISO ePM10 50%, ePM2.5 70% Filter Options	✓	✓	✓
Very Low Noise Levels	✓	✓	✓
Built-In Humidistat	✓	✓	✓
Active Frost Protection to -20°C	✓	✓	✓
Delay-On	✓	✓	✓
Clean Filter Indicator (Time)	✓	✓	✓
Clean Filter Indicator (Pressure)	X	✓	X
Fault Code Indicator	✓	✓	✓
Switched Live	✓	✓	✓
Volt Free	✓	✓	✓
0V - 10V Proportional Control	O	O	O
Lightweight	✓	✓	✓
22mm or 32mm Condensate Connection	✓	✓	✓
Left/Right Orientation Through Control	✓	✓	✓
PIN Number Lock	✓	✓	✓
Running Time Indicator	✓	✓	✓
External Pre-Heater Controller	O	O	O
External Post-Heater Controller	O	O	O
Built-in Pre-Heater	X	X	✓
Enthalpy Heater Exchanger	O	O	O
Fan Curve Flow	✓	✓	✓
Constant Volume	X	✓	X
Email Status Notifications	X	✓	X
Soft-Start Boost	✓	✓	✓
Mounting Options	Wall	Surface	

O - Optional extra. Contact us for more information.

Vent-Axia

Dimensions (mm)

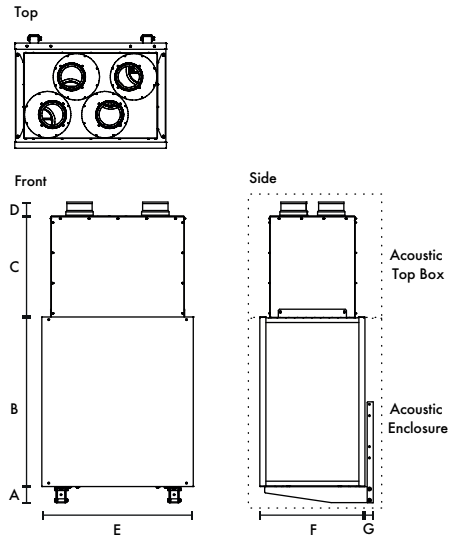
Unit



A	B	C	D	E	F	G	H	I	J	kg
760	660	443	63	343	210	503	197	93	125	27

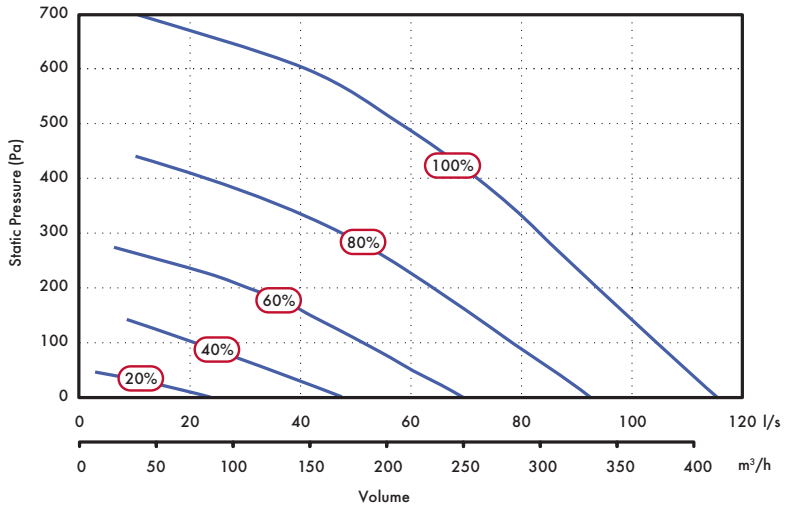
Packed weight: 32kg

Acoustic Solution



A	B	C	D	E	F	G	Acoustic Top Box kg	Acoustic Enclosure kg	Spigot
80	840	501	68	750	520	40	14	27	125

Performance



Sound Spectrum (Unit only)

Speed	Test mode	Octave Band (Hz) Sound Power Levels, dB 63	125	250	500	1k	2k	4k	8k	LwA	SPL dB(A) @ 3m
20%	Supply	52.9	50.9	46.8	43.0	34.6	27.1	19.2	25.4	43.9	26.4
	Extract	50.3	49.0	36.0	31.5	23.6	16.1	18.9	25.3	36.4	18.9
	Breakout	34.6	34.8	35.7	34.9	29.6	25.1	21.0	25.3	36.0	15.5
40%	Supply	59.5	56.5	59.4	55.0	48.2	42.6	31.8	26.1	55.9	38.4
	Extract	51.9	51.3	50.4	41.2	35.0	25.3	19.8	25.4	44.8	27.3
	Breakout	40.2	42.6	46.5	45.4	41.0	36.2	25.5	25.3	46.5	26.0
60%	Supply	66.9	62.4	63.3	62.0	57.9	53.5	43.4	34.2	63.2	45.7
	Extract	60.6	60.3	54.2	49.5	44.4	36.2	27.9	26.3	51.7	34.2
	Breakout	45.5	49.8	52.5	53.1	49.7	46.7	36.2	26.9	54.5	34.0
80%	Supply	82.4	67.6	65.2	67.6	64.2	60.8	50.8	43.2	69.2	51.7
	Extract	75.5	68.6	59.3	56.0	48.3	44.2	36.9	31.3	58.6	41.1
	Breakout	59.2	55.0	56.8	60.0	55.4	53.9	44.1	33.4	61.0	40.5
100%	Supply	79.4	69.6	66.6	75.1	64.9	63.6	53.4	45.7	73.7	56.2
	Extract	72.4	70.5	60.5	56.4	49.8	46.3	39.0	33.4	59.5	42.0
	Breakout	63.0	57.1	58.5	63.7	56.8	55.9	46.4	36.2	63.5	43.0

Sound Spectrum (Unit with Acoustic Solution)

Speed	Test mode	Octave Band (Hz) Sound Power Levels, dB 63	125	250	500	1k	2k	4k	8k	LwA	SPL dB(A) @ 3m
20%	Supply	54.7	50.5	41.5	30.8	18.6	14.7	18.2	24.0	38.0	20.5
	Extract	54.8	41.7	31.4	20.2	15.2	13.8	18.3	24.3	31.9	14.4
	Breakout	36.6	47.3	38.0	24.7	19.3	16.6	19.1	23.6	34.0	13.5
40%	Supply	61.0	57.7	56.0	39.0	27.5	16.6	18.4	24.1	48.9	31.4
	Extract	55.7	50.8	44.6	26.8	19.1	15.0	18.2	24.0	39.2	21.7
	Breakout	55.9	55.2	48.2	35.5	29.9	20.9	20.4	25.3	42.6	22.1
60%	Supply	64.5	64.3	56.2	48.6	36.0	22.8	19.0	24.2	52.3	34.8
	Extract	59.4	57.3	46.6	36.0	25.6	17.4	18.6	24.5	43.9	26.4
	Breakout	43.5	60.5	49.5	43.5	39.0	32.0	23.8	23.7	47.6	27.1
80%	Supply	68.9	65.9	59.9	53.9	41.4	29.3	21.6	24.7	55.9	38.4
	Extract	63.1	69.3	52.6	43.0	33.4	23.7	20.2	24.6	54.5	37.0
	Breakout	48.3	69.8	52.7	48.3	44.7	39.8	33.2	25.9	57.1	36.6
100%	Supply	72.5	70.5	63.1	56.1	43.9	33.0	23.7	25.2	59.3	41.8
	Extract	70.3	61.9	56.2	45.4	36.6	28.0	22.9	24.6	51.5	34.0
	Breakout	54.3	67.1	63.3	51.3	47.9	43.9	38.5	28.7	57.7	37.2

Tested according to BS EN 13141-7:2010. Breakout quoted spherical. Supply and Extract quoted hemispherical. For in-duct data, end reflections are added based on the spigot size of the unit.

Vent-Axia

Consultant's Specification

Specification

The supply and extract ventilation unit shall be the Sentinel Kinetic Advance as manufactured by Vent-Axia and shall be sized as indicated on the drawings and shall be in accordance with the particular specification.

The unit shall be fully insulated for thermal and acoustic performance and shall incorporate a counterflow multiplate heat exchanger with independently verified thermal efficiency up to 93%. The heat exchanger shall be protected by ISO 45% Coarse (G3) Grade filters on intake and extract air-flows. The unit shall have the facility to accommodate ISO ePM10 (M5) and ePM2.5 (F7) filters. The filters shall be accessible via tool-free access doors. The heat exchanger, motors, summer bypass and all other serviceable parts shall be accessible through the front of the unit.

Supply air to the room shall be pre-heated by the extract air via the integrated composite plastic counter-flow heat recovery cell. The Sentinel Kinetic shall automatically vary the ventilation rate via EC/DC motors, as it receives signals from optional or in-built sensor inputs. When a signal is received, the fans shall either vary their speed proportionally or on a trickle/boost principle.

The unit shall have the facility to commission the supply and extract fans individually via in-built minimum and maximum speed adjustment, or alternative wired remote control unit. The fans themselves shall have independent, infinitely variable speed control.

Unit Specification

The unit shall be manufactured with an ABS Outer case construction, with the ability to alter the spigot configuration via the on-board controller. The unit shall have a high efficiency composite plastic counter-flow heat exchanger, supply and extract filters (up to ISO ePM2.5 (F7)), automatic 100% summer bypass, integral minimum and maximum infinitely variable speed controls with facia mounted failure indication.

The unit shall have low energy, high efficiency EC/DC fan/motor assemblies with sealed for life bearings. The impellers shall be high efficiency backward curved centrifugal type, achieving an SFP as low as 0.38W/l/s (EN 308).

The unit shall have a heat exchanger cell with a thermal efficiency of up to 93% when tested to EN 308. This shall be protected by ISO 45% Coarse (G3) grade synthetic filters on supply and extract, with the option of ISO ePM10 (M5), ISO ePM2.5 (F7) or external carbon activated filters. The unit shall come with both a 22mm and 32mm connection for draining condensation.

The unit shall be constructed with a removable tool-free front panel which gives access to the removable on-board controller and other accessories. The EPS panel can then be removed with 4 screws allowing full maintenance access. This shall provide access to the following:

- ✓ Supply or extract fan
- ✓ Heat exchanger
- ✓ Access to the electrical connections

To reduce breakout noise, the MVHR unit shall be provided with an Acoustic Enclosure of steel construction lined with class '0' acoustic foam. To reduce in-duct noise, the top of the MVHR shall be fitted with an Acoustic Top Box to provide attenuation to the 4 ducts of the unit. This Acoustic Top Box shall be of steel construction lined with acoustic class '0' foam with the MVHR spigots linked to the Top Box via 4 separate attenuated ducts. The acoustic enclosure and top box shall each be independently tested for noise to BS EN 13141-7.

Access shall be provided for wiring termination and setup/commissioning. The backlit touch-screen user interface therein shall be removable for remote mounting if required. Filters shall be accessed via the two pull out drawers near the top of the unit.

Units shall be as manufactured by Vent-Axia Ltd.

Standard Controls

The Sentinel Kinetic Advance shall incorporate the following functions integrally mounted through a touch-screen, adjustable controller fitted by the manufacturer: -

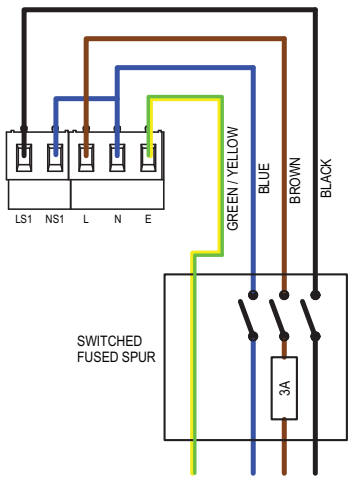
- ✓ Integral infinitely variable fan speed control on supply and extract.
- ✓ 6 speeds; 4 adjustable
- ✓ Left or Right hand spigot configuration, programmable by the on board controller
- ✓ Filter change wizard which stops the motors during filter replacement
- ✓ 0-10V proportional speed adjustment
- ✓ Volt free contacts
- ✓ 24V external sensor supply, eg PIR sensor
- ✓ Filter check facility adjustable in one month increments

The unit shall incorporate:

- ✓ An integral humidity sensor with the following features:
  Ambient Response; Raises the humidity trigger point as dwelling temperature reduces.
- ✓ Rapid Response: Monitors the rate of change in humidity and triggers increased airflow even if the humidity trigger threshold is not reached.
- ✓ Proportional Response; incrementally increases the fan speed to reduce noise and reduce energy consumption.
- ✓ WiFi connectivity for remote commissioning
- ✓ USB functionality for commissioning
- ✓ The unit shall incorporate an automatic 100% summer bypass damper which monitors internal and external temperatures to maintain the user comfort temperature (default 21°C) :
  - 'Evening Fresh' turns the unit to maximum speed with the bypass operational for 2 hours or until the user comfort temperature is reached (default 21°C).
  - 'Night Time Fresh' will run the unit on maximum speed with the bypass operational throughout the night or until the dwelling reaches minimum temperature (default 14°C).

Independently acoustically tested to BS EN 13141-7:2010

Electrical Connection



Appendix 5 Facade Calculations

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FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

CLIENT:	MIDGARD
PROJECT:	The Castings, Manchester
ROOM:	Bedroom with direct line of sight to Great Ancoats Street and tram line
RUN REF:	20728
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)

	W	L		H
Room Dimensions [m]	2.8	3.7	X	2.4

Room Volume =	24.5	m3
Partition Area =	6.7	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	60.0								
		41.8	45.9	49.4	52.8	56.0	53.2	48.0	**Reference spectrum**

REVERBERATION TIME

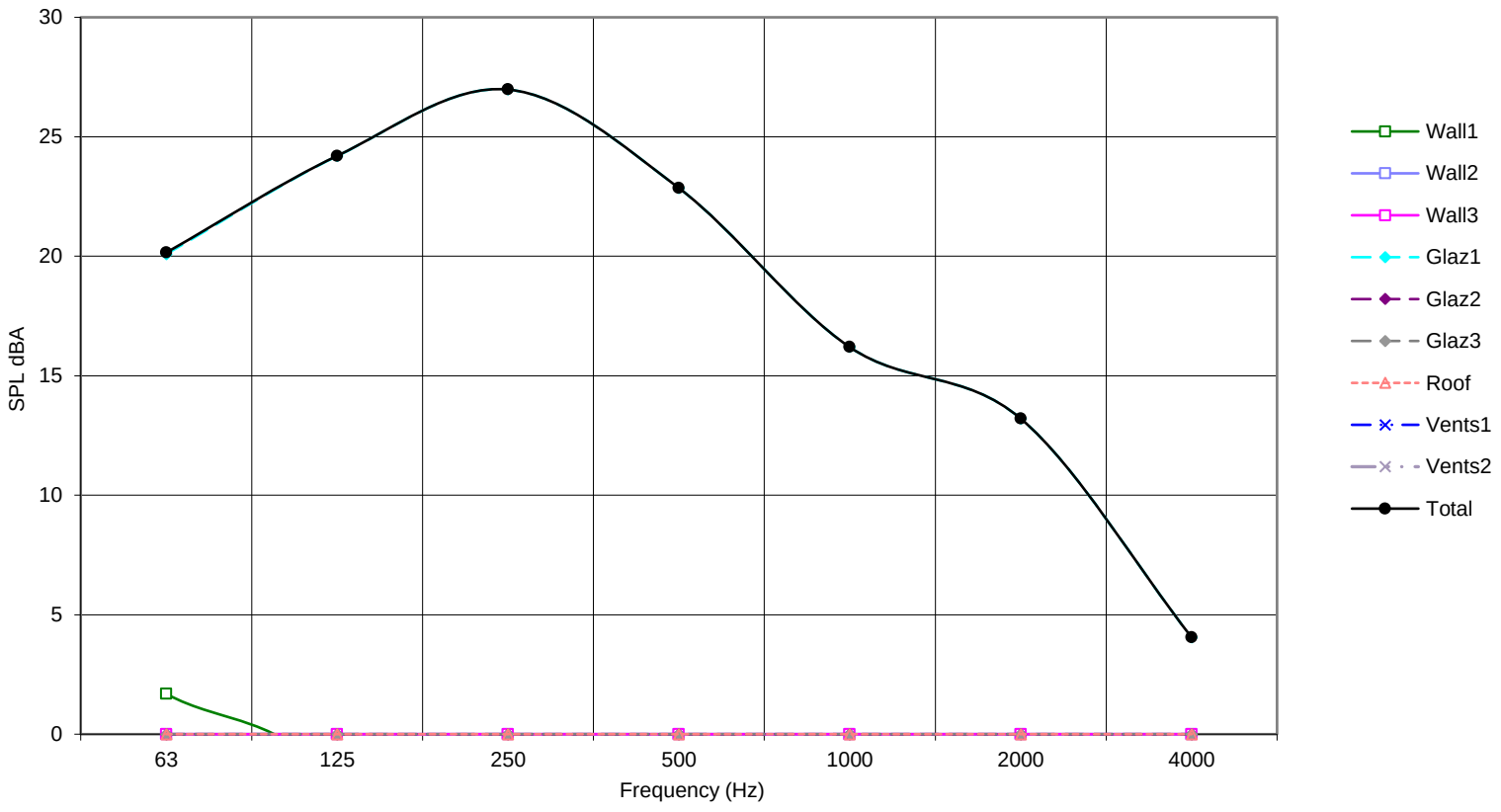
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	WALL TYPE 2 - 390 mm	2.4	38	46	64	84	111	126	128	0%	73	-5	-12
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	4.3	22	22	23	30	40	40	44	99%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		24	24	25	32	42	42	46				
	Resultant SPL inside room excluding ventilators dB	30.5	20	24	27	23	16	13	4	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**30.5**	20	24	27	23	16	13	4

Element contribution to total internal noise level



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

CLIENT:	MIDGARD
PROJECT:	The Castings, Manchester
ROOM:	Bedroom with direct line of sight to Great Ancoats Street and tram line
RUN REF:	20728
VARIANT:	Night-time Average Noise Levels (LAeq,8hr)

	W	L		H	
Room Dimensions [m]	2.8	3.7	X	2.4	
Room Volume =				24.5	m3
Partition Area =				6.7	m2
Ventilation ref area =				10.0	m2
Free Field SPL K =				3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	56.0								
		37.8	41.9	45.4	48.8	52.0	49.2	44.0	**Reference spectrum**

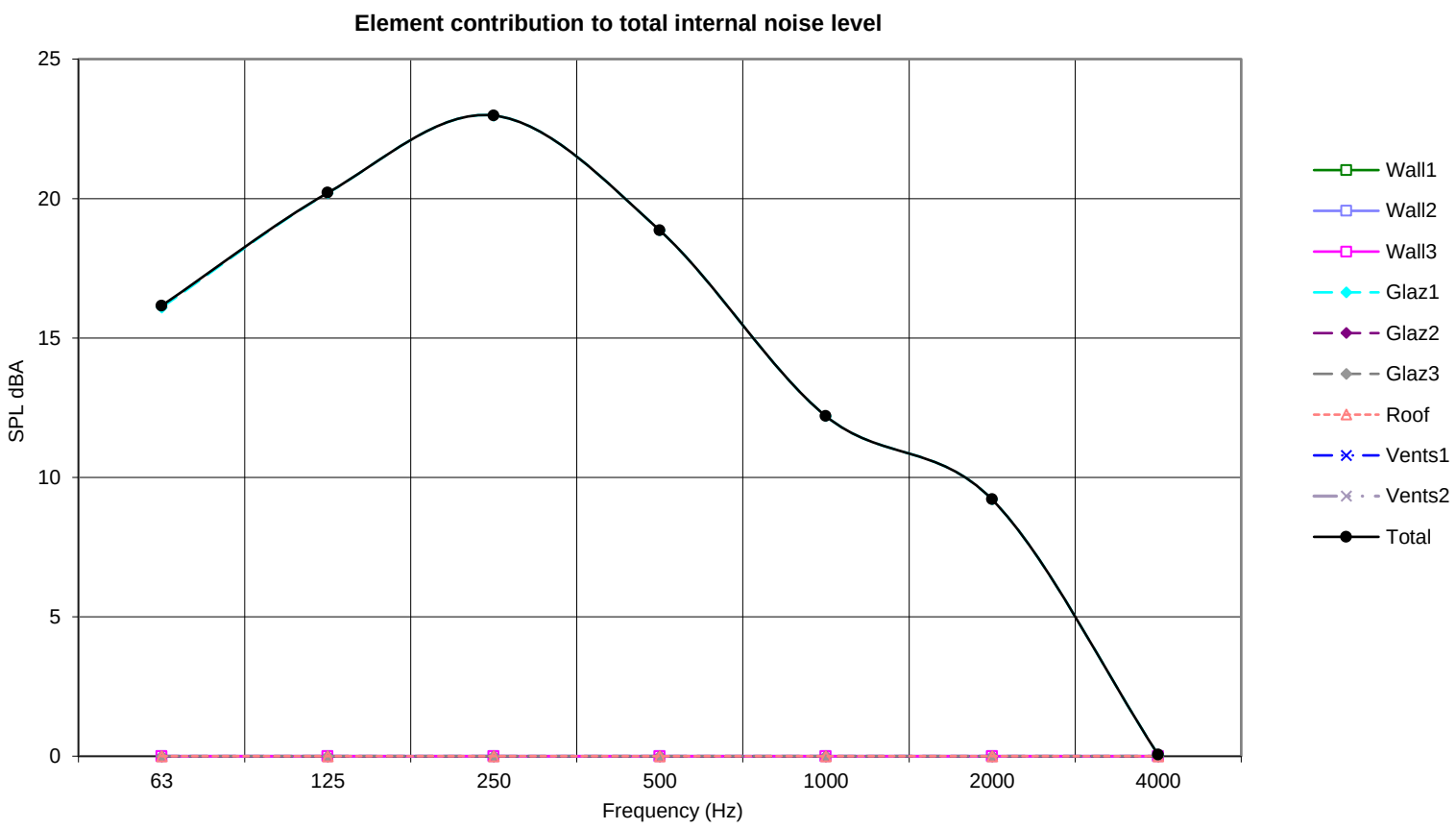
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	WALL TYPE 2 - 390 mm	2.4	38	46	64	84	111	126	128	0%	73	-5	-12
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	4.3	22	22	23	30	40	40	44	98%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Resultant composite Façade SRI			24	24	25	32	42	42	46				
Resultant SPL inside room excluding ventilators dB		26.5	16	20	23	19	12	9	0	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Resultant SPL inside room through ventilators dB		-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**26.5**	16	20	23	19	12	9	0



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

CLIENT:	MIDGARD
PROJECT:	The Castings, Manchester
ROOM:	Bedroom with direct line of sight to Great Ancoats Street and tram line
RUN REF:	20728
VARIANT:	Night Time Maximum Noise Levels (LAmax)

	W	L		H	
Room Dimensions [m]	2.8	3.7	X	2.4	
Room Volume =				24.5	m3
Partition Area =				6.7	m2
Ventilation ref area =				10.0	m2
Free Field SPL K =				3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	71.0	40.1	46.2	65.8	66.2	65.1	60.2	52.8	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		40.1	46.2	65.8	66.2	65.1	60.2	52.8	**Direct input**

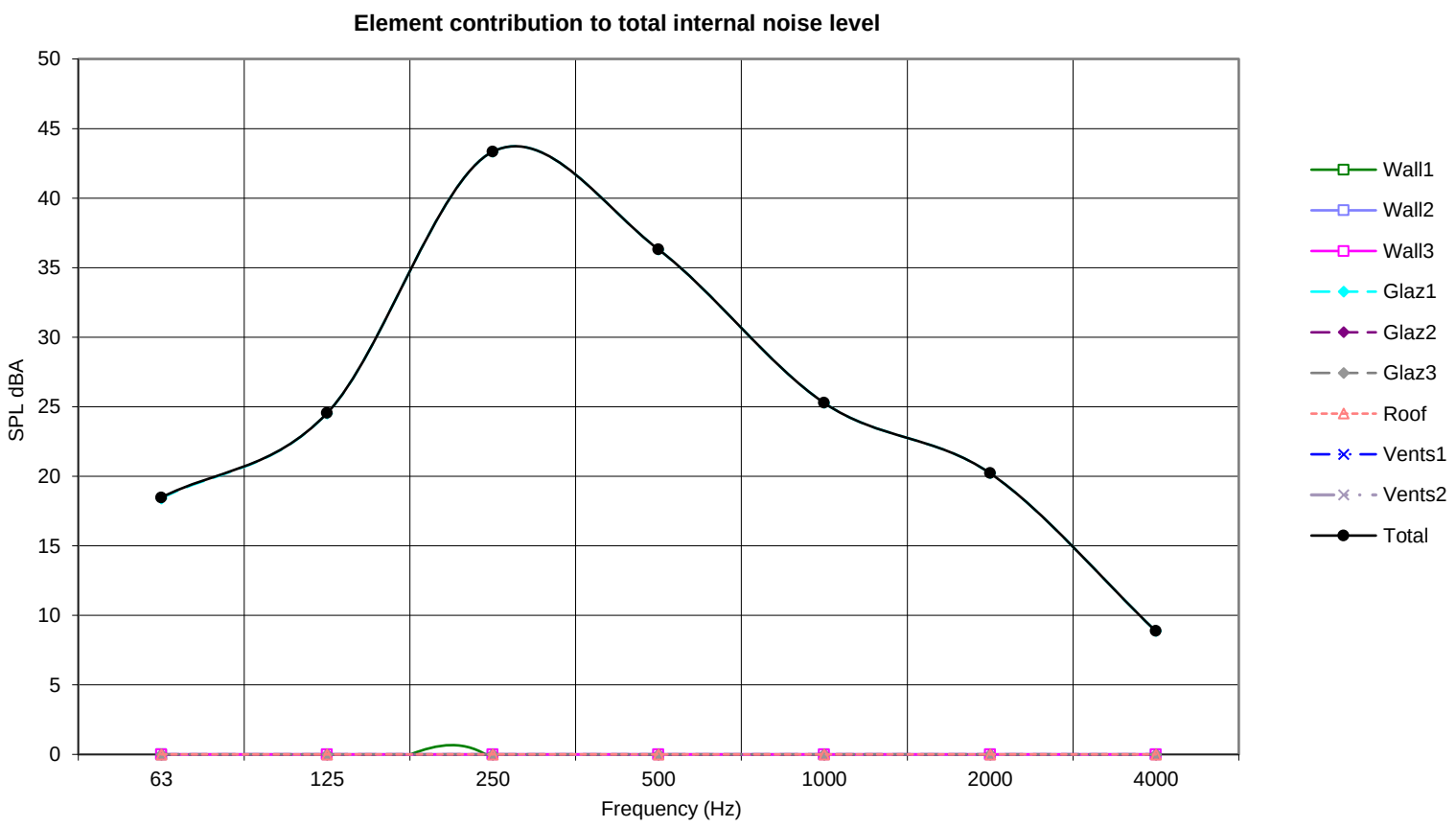
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	WALL TYPE 2 - 390 mm	2.4	38	46	64	84	111	126	128	0%	73	-5	-12
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	4.3	22	22	23	30	40	40	44	100%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		24	24	25	32	42	42	46				
	Resultant SPL inside room excluding ventilators dB	44.3	18	25	43	36	25	20	9	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**44.3**	18	25	43	36	25	20	9



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

CLIENT:	MIDGARD
PROJECT:	The Castings, Manchester
ROOM:	Living room with direct line of sight to Great Ancoats Street and tram line
RUN REF:	20728
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)

	W		L		H
Room Dimensions [m]	3.0	X	7.9	X	2.4

Room Volume =	56.9	m3
Partition Area =	25.6	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	60.0								
		41.8	45.9	49.4	52.8	56.0	53.2	48.0	**Reference spectrum**

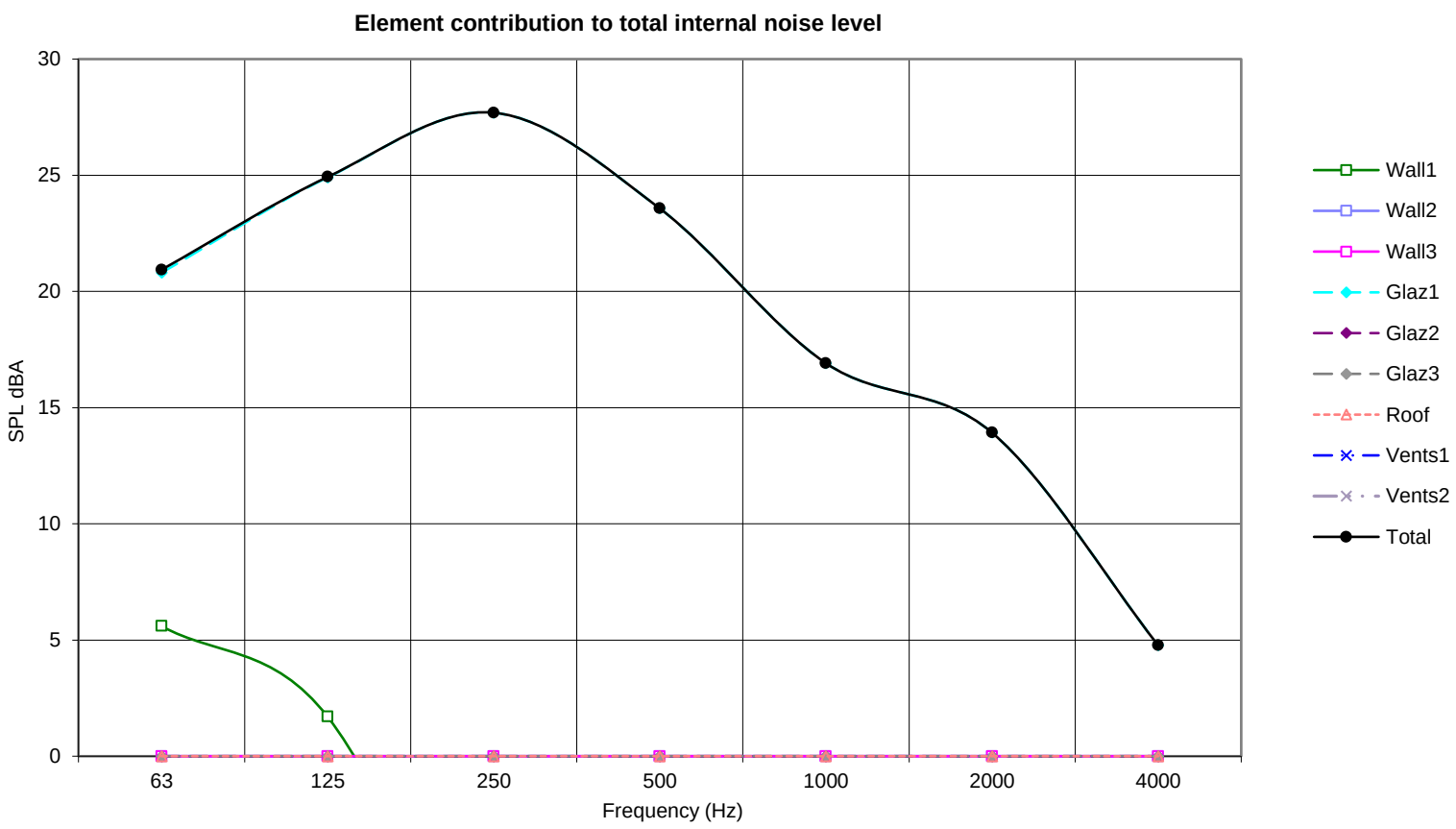
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	WALL TYPE 2 - 390 mm	13.8	38	46	64	84	111	126	128	0%	73	-5	-12
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	11.8	22	22	23	30	40	40	44	99%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		25	25	26	34	44	44	48				
	Resultant SPL inside room excluding ventilators dB	31.2	21	25	28	24	17	14	5	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**31.2**	21	25	28	24	17	14	5



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W	L	H
CLIENT:	MIDGARD	Room Dimensions [m]	2.8	3.7	X 2.4
PROJECT:	The Castings, Manchester				
ROOM:	Bedroom - south	Room Volume =	24.5	m3	
RUN REF:	20728	Partition Area =	6.7	m2	
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)	Ventilation ref area =	10.0	m2	
	SELECT Free Field or Façade SPL for model input >>>	Free Field SPL K =	3	dB	

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	57.0								
		38.8	42.9	46.4	49.8	53.0	50.2	45.0	**Reference spectrum**

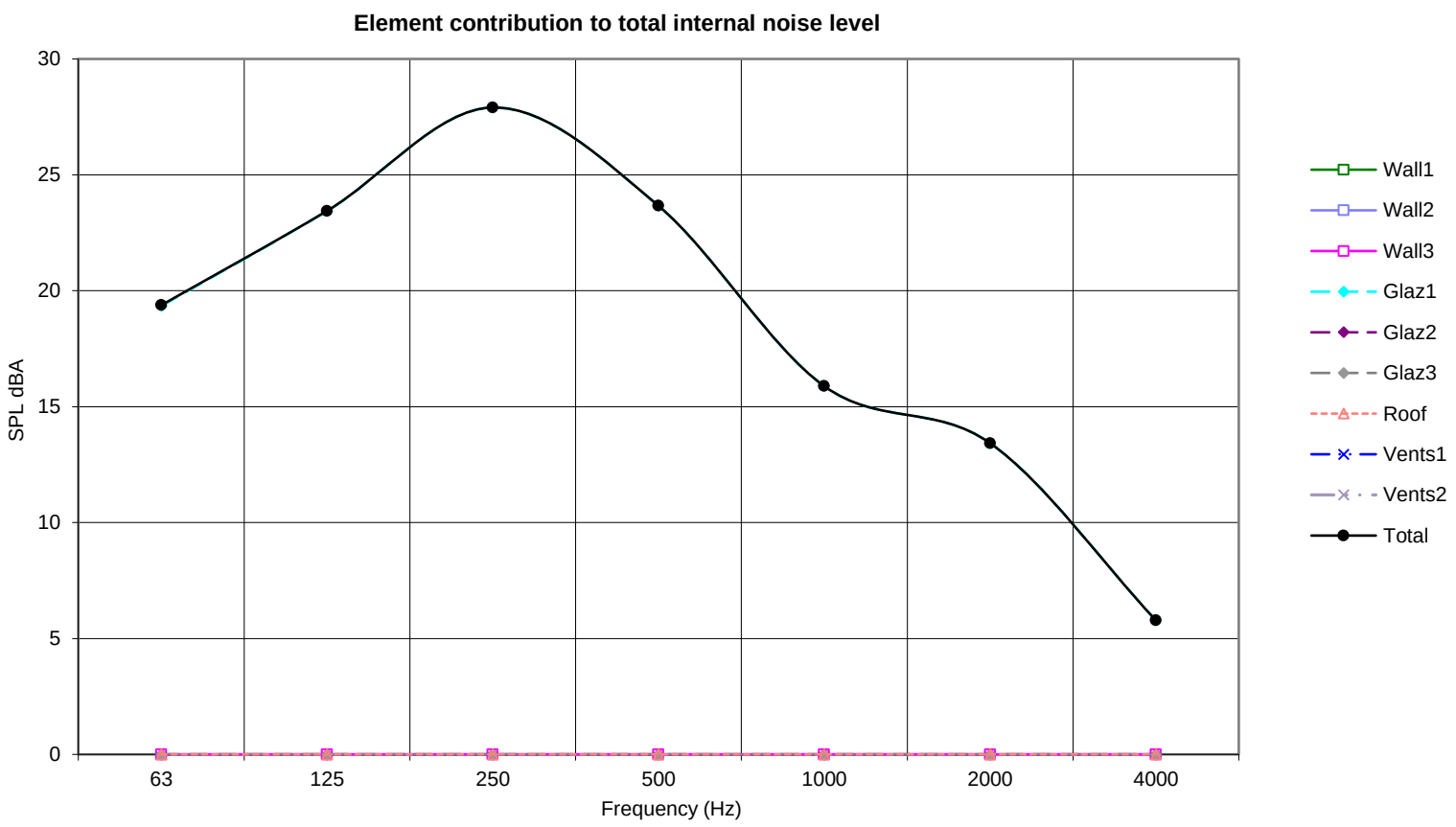
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	WALL TYPE 2 - 390 mm	2.4	38	46	64	84	111	126	128	0%	73	-5	-12
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	4.3	20	20	19	27	38	37	40	99%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		22	22	21	28	39	39	42				
	Resultant SPL inside room excluding ventilators dB	30.9	19	23	28	24	16	13	6	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**30.9**	19	23	28	24	16	13	6



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

CLIENT:	MIDGARD
PROJECT:	The Castings, Manchester
ROOM:	Bedroom - south
RUN REF:	20728
VARIANT:	Night-time Average Noise Levels (LAeq,8hr)

	W	L		H
Room Dimensions [m]	2.8	3.7	X	2.4

Room Volume =	24.5	m3
Partition Area =	6.7	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	53.0								
		34.8	38.9	42.4	45.8	49.0	46.2	41.0	**Reference spectrum**

REVERBERATION TIME

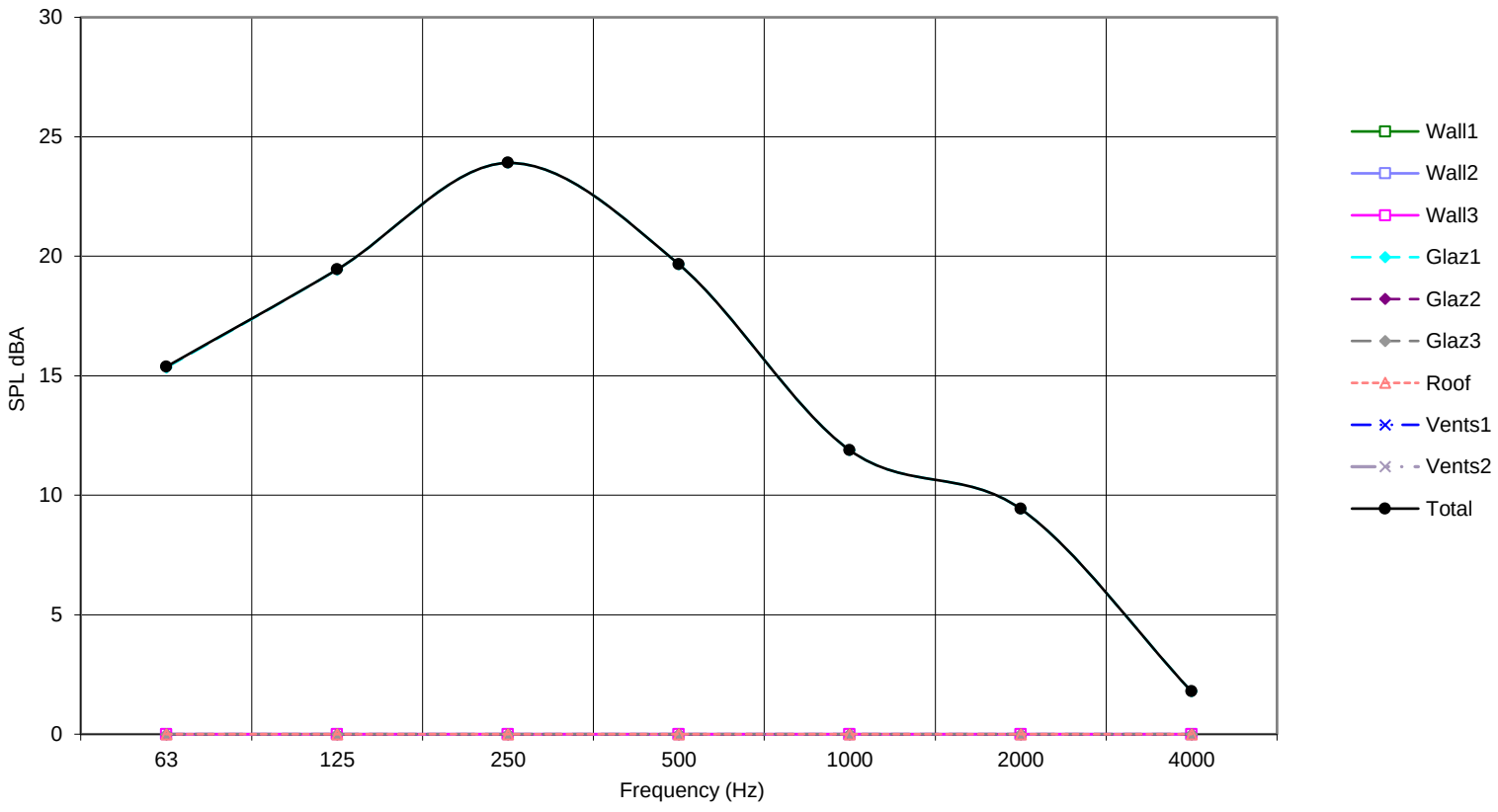
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	WALL TYPE 2 - 390 mm	2.4	38	46	64	84	111	126	128	0%	73	-5	-12
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	4.3	20	20	19	27	38	37	40	99%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Resultant composite Façade SRI			22	22	21	28	39	39	42				
Resultant SPL inside room excluding ventilators dB		26.9	15	19	24	20	12	9	2	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Resultant SPL inside room through ventilators dB		-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**26.9**	15	19	24	20	12	9	2

Element contribution to total internal noise level



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W	L	H
CLIENT:	MIDGARD	Room Dimensions [m]	2.8	3.7	X 2.4
PROJECT:	The Castings, Manchester				
ROOM:	Bedroom - south	Room Volume =	24.5	m3	
RUN REF:	20728	Partition Area =	6.7	m2	
VARIANT:	Night Time Maximum Noise Levels (LAmax)	Ventilation ref area =	10.0	m2	
	SELECT Free Field or Façade SPL for model input >>>	Free Field SPL K =	3	dB	

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	65.0	34.1	40.2	59.8	60.2	59.1	54.2	46.8	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		34.1	40.2	59.8	60.2	59.1	54.2	46.8	**Direct input**

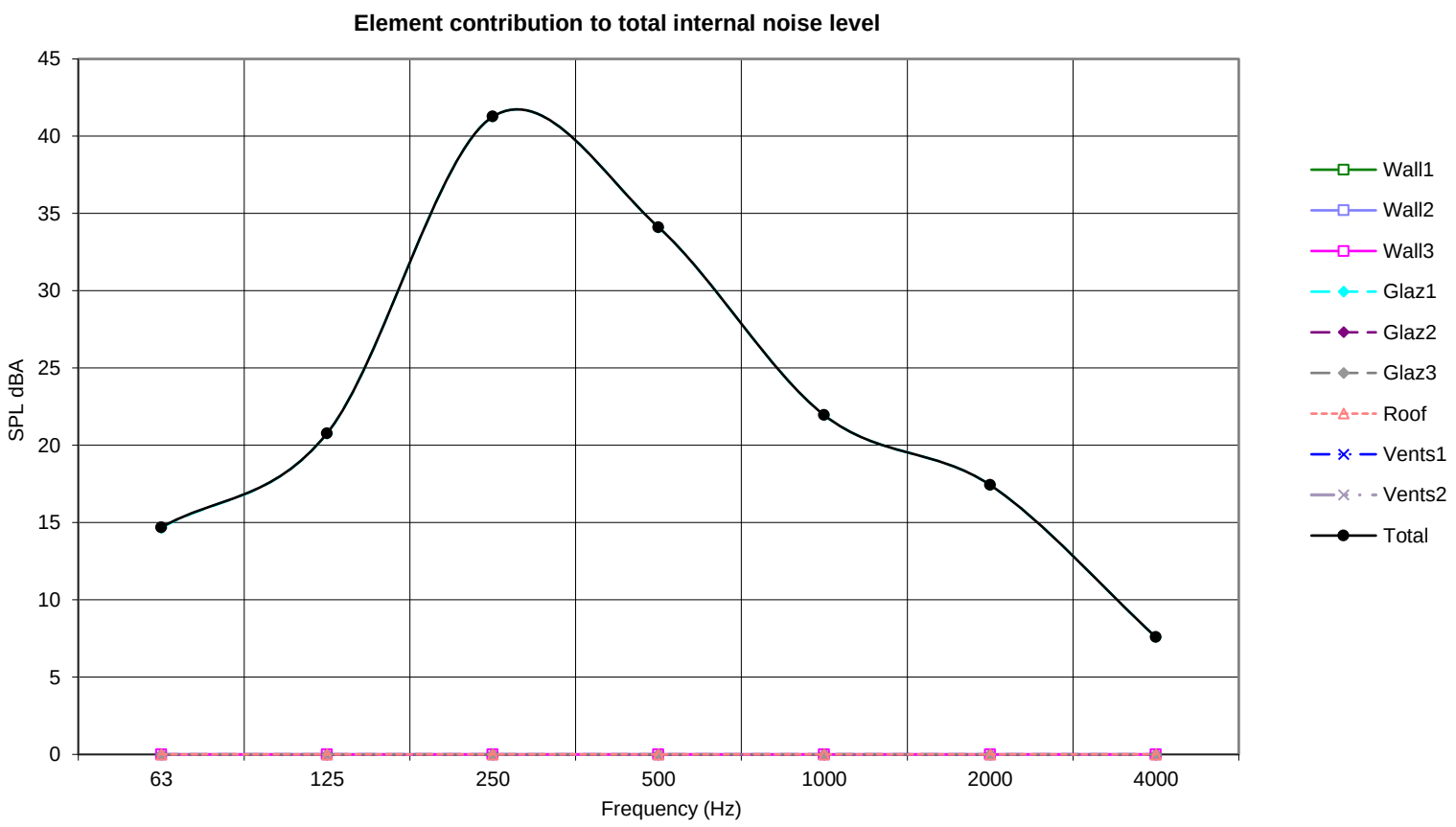
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	WALL TYPE 2 - 390 mm	2.4	38	46	64	84	111	126	128	0%	73	-5	-12
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	4.3	20	20	19	27	38	37	40	100%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		22	22	21	28	39	39	42				
	Resultant SPL inside room excluding ventilators dB	42.1	15	21	41	34	22	17	8	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**42.1**	15	21	41	34	22	17	8



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

CLIENT:	MIDGARD
PROJECT:	The Castings, Manchester
ROOM:	Living room - south
RUN REF:	20728
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)

	W		L		H
Room Dimensions [m]	3.0	X	7.9	X	2.4

Room Volume =	56.9	m3
Partition Area =	25.6	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	57.0								
		38.8	42.9	46.4	49.8	53.0	50.2	45.0	**Reference spectrum**

REVERBERATION TIME

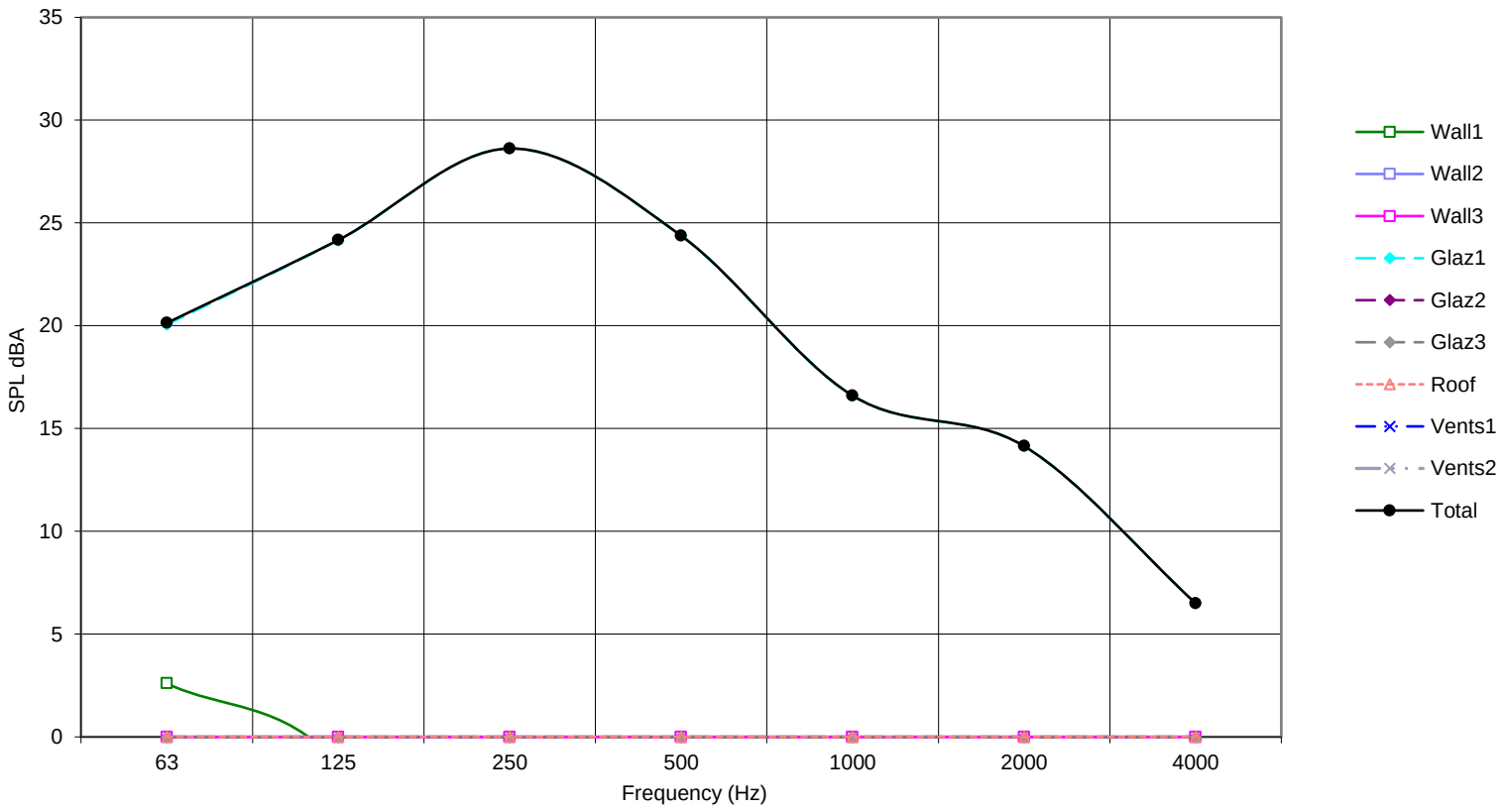
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	WALL TYPE 2 - 390 mm	13.8	38	46	64	84	111	126	128	0%	73	-5	-12
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	11.8	20	20	19	27	38	37	40	100%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Resultant composite Façade SRI			23	23	22	30	41	41	43				
Resultant SPL inside room excluding ventilators dB		31.6	20	24	29	24	17	14	7	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Resultant SPL inside room through ventilators dB		-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**31.6**	20	24	29	24	17	14	7

Element contribution to total internal noise level

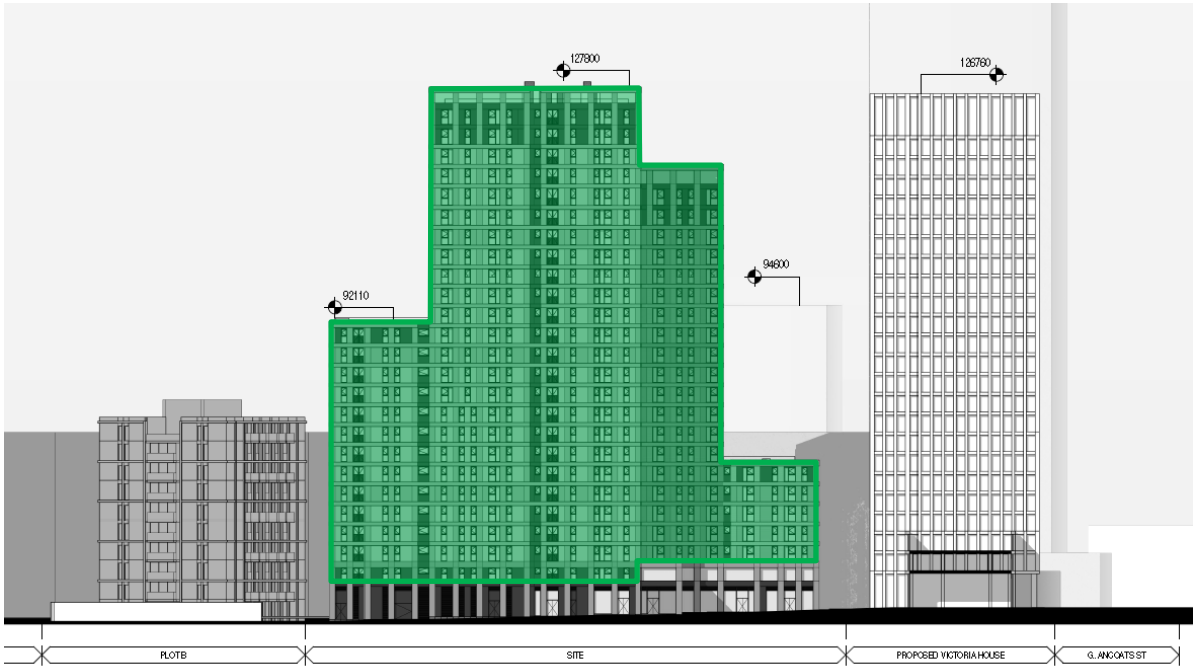


Appendix 6 Acoustic Facade Specification

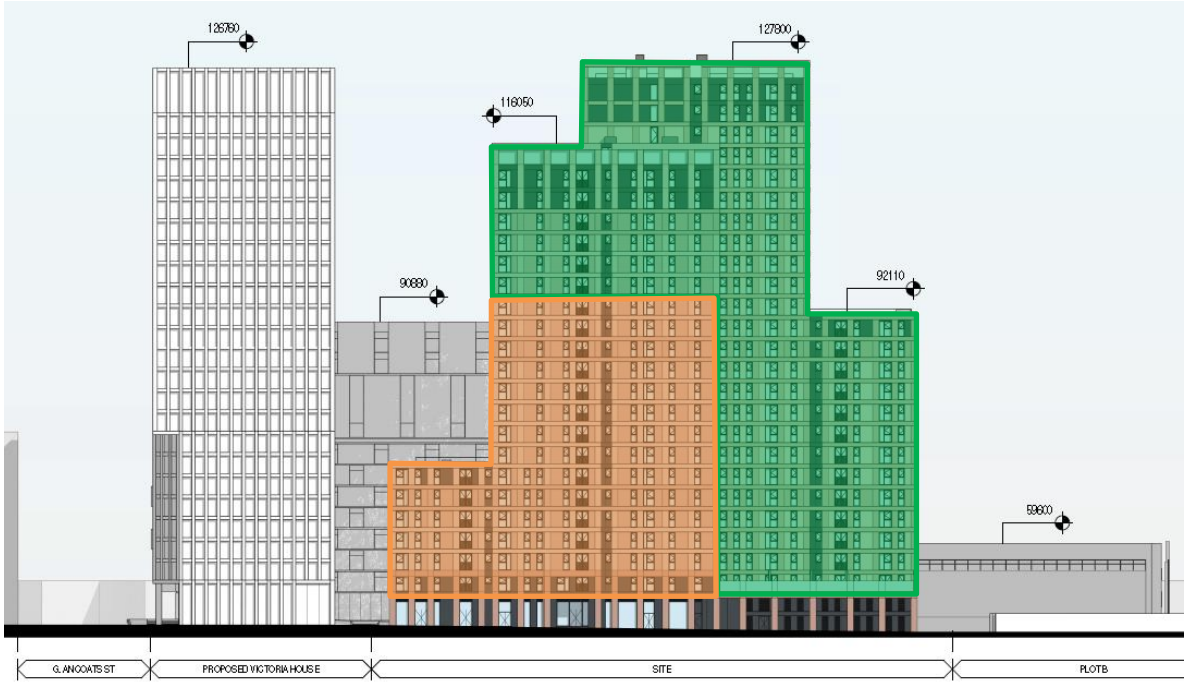
Reference	Colour	Glazing Specification
FC01		30 dB Rw+Ctr
FC02		27 dB Rw+Ctr

NOTES: Values must include the Ctr correction. Manufacturers or suppliers should provide laboratory test data demonstrating that the proposed systems are capable of achieving the values given. Windows should be tested as complete systems (rather than just the glazing in isolation).

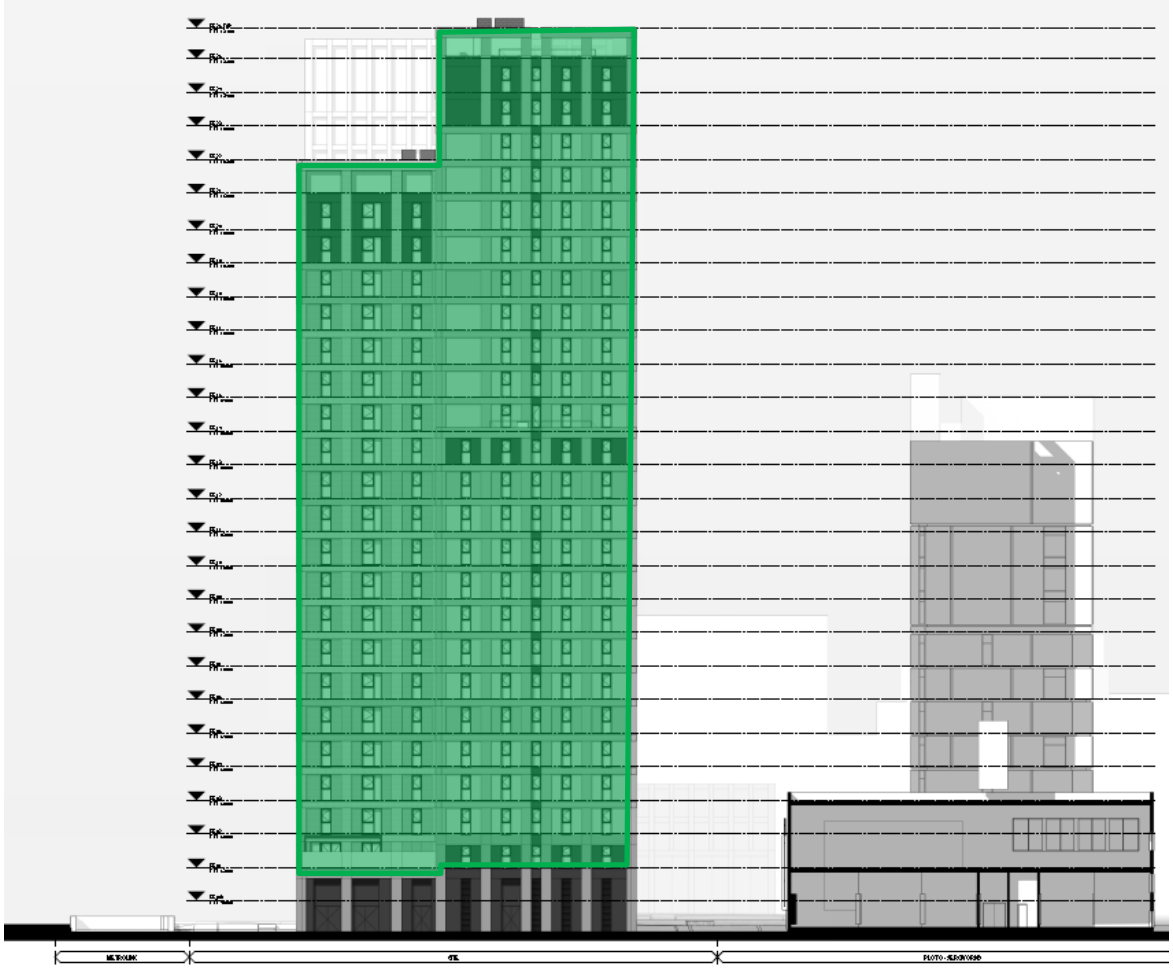
Heyrod Street Elevation:



Longacre Street Elevation:



South Elevation:



North Elevation:

cass allen

Architectural & Environmental Acousticians

Noise & Vibration Engineers

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