



DOWNING LIVING

PLOT 11 IN FIRST STREET SOUTH, MANCHESTER

REPORT TO DISCHARGE PLANNING CONDITION 16

21 June 2022

AEC REPORT: P3921/R6a/PJK

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1.0 INTRODUCTION

1.1 Acoustic & Engineering Consultants Limited (AEC) has been instructed by Downing Living to provide a report presenting the necessary information to discharge Planning Condition 16 placed on the proposed development located at Plot 11 in First Street South, Manchester.

1.2 The planning application number for the site is 125573/FO/2019 dated 09 March 2021.

1.3 Planning Condition 16 states:

“Prior to the commencement of the superstructure a scheme for acoustically insulating and mechanically ventilating the residential accommodation against noise from adjacent roads shall be submitted to and approved in writing by the City Council as local planning authority.

The approved noise insulation 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 L_{Amax,F} by more than 15 times)

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

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.”

Reason - To secure a reduction in noise in order to protect future residents from noise nuisance, pursuant to policies SP1 and DM1 of the Core Strategy and saved UDP Policy DC26.”

1.4 This report includes a summary of the noise levels measured on and around the development site, the determined external noise levels affecting the proposed blocks and the glazing and ventilation strategy to comply with Planning Condition 16.

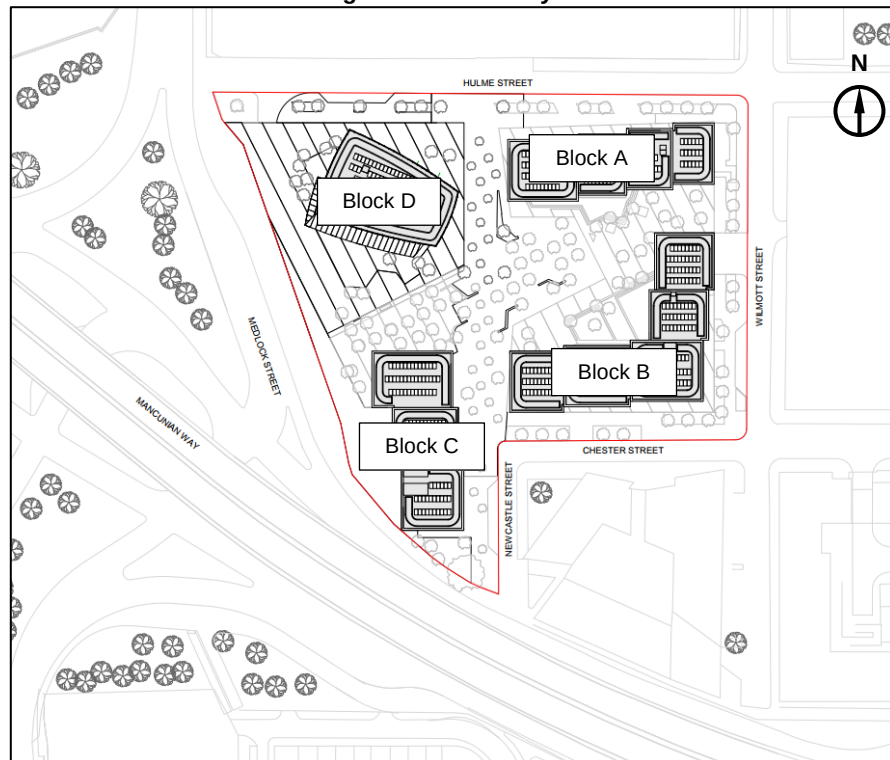
1.5 It is understood that Blocks A and B and D will be occupied prior to the construction of Block C. Therefore, the glazing and ventilation strategy has been based on the determined noise external to these blocks without Block C. The internal layout of Block C is currently being developed and the glazing and ventilation strategy for Block C will be issued as a standalone report.

1.6 Acoustic terminology is discussed in brief in Appendix A.

2.0 SITE AND PROPOSED DEVELOPMENT DESCRIPTION

- 2.1 The site, which is currently vacant land, is located within Manchester City Centre, as identified on Figure 3.1. To the south of the site is the Mancunian Way (A57M), a two-lane part of the Manchester's inner ring road. The section of the Mancunian Way which runs past the site is on a fly over and is around 7m above ground level.
- 2.2 To the west of the site is Medlock Street Junction roundabout which has three carriageways.
- 2.3 To the north of the site is Hume Street which links the site with Oxford Road to the east. There is no access between Hulme Street and Medlock Street Junction.
- 2.4 The east of the site is bound by Wilmott Street, beyond which is another unoccupied plot of land.
- 2.5 The south-east corner of the site is bound by Chester Street and Newcastle Street and to the south of these are three student accommodation blocks.
- 2.6 Based on the drawings prepared by Simpson Haugh architects, the scheme will include four accommodation blocks. Blocks A and B will be built off a single podium level which will contain a café and gym. Block A will be 22 storeys high and Block B 26 storeys high. The remaining two blocks will not contain any commercial units, Block C will be 17 storeys high and Block D will be 44 storeys high. The site layout is presented in Figure 2.1, below.

Figure 2.1 – Site Layout



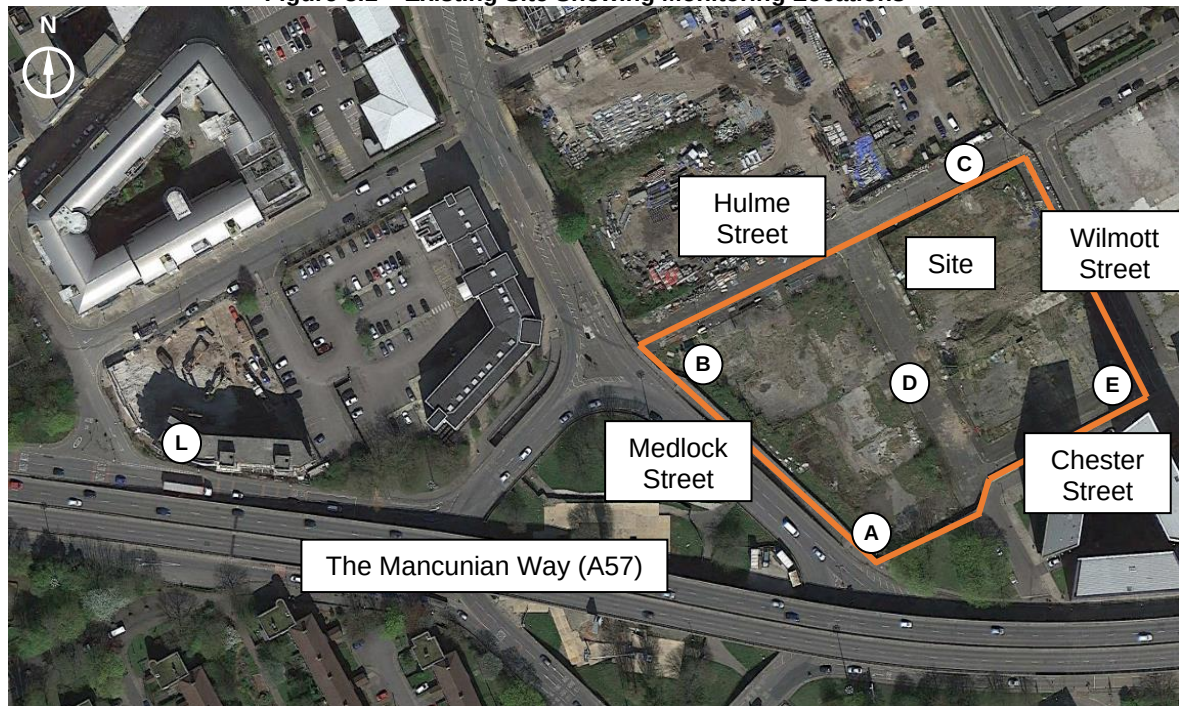
3.0 NOISE MEASUREMENTS

- 3.1 A daytime attended noise level survey was undertaken by AEC between 1000 and 1430h on Wednesday 10 July 2019. An attended night-time survey was undertaken between 2300h on Friday 12 July and 0100h on Saturday 13 July 2019.
- 3.2 Unattended noise level measurements were also undertaken at a location on Rover Street (to the west of the site), which overlooks the Mancunian Way, between 1800h on Thursday 11 July and 1130h on Monday 15 July 2019.
- 3.3 All measurements were undertaken under free-field conditions in general accordance with BS7445-1: 2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'. Full details of the noise surveys are presented in Appendix 8 of the Environmental Statement for the development. However, a summary of the measurement procedure and measured noise levels is included below.

Attended Measurements

- 3.4 The attended noise level measurements were undertaken at five locations around the development site as identified on Figure 3.1 below.

Figure 3.1 – Existing Site Showing Monitoring Locations



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- 3.5 The locations were selected to measure the noise levels from the different roads around the site. During the both the daytime and night-time measurement periods it was observed that, with the exception of Location B, the dominant noise source at each location was road traffic on the Mancunian Way.

- 3.6 The noise levels at Location B were a combination of road traffic on the Mancunian Way and on the Medlock Street Junction.
- 3.7 The night-time maximum noise level at each location was due to a HGV pass by on either the Medlock Street Junction or the Mancunian Way.
- 3.8 It should be noted that there was very little road traffic on Hulme Street, Wilmott Street, Chester Street and Newcastle Street during the daytime or night-time period.
- 3.9 A summary of free-field daytime and night-time noise levels measured at Locations A to E are presented in Table 3.1 below.

Table 3.1 – Summary of Free-Field Noise Levels at Measurement Locations A to E

Location (Figure B.1)	Noise Levels, dB				
	Daytime (0700-2300h)			Night-Time (2300-0700h)	
	L _{Aeq,T}	L _{A10,T}	L _{Amax, F}	L _{Aeq,T}	L _{Amax,F}
A	74	76	86	72	88
B	65	66	83	63	80
C	61	62	77	59	66
D	63	66	67	61	75
E	63	64	69	60	66

Long Term Unattended Measurements

- 3.10 It was not possible to measure noise levels on site from a position above the Mancunian Way. Therefore, unattended long-term measurements were undertaken on the second floor of a development on River Street (identified as L on Figure 3.1). This location had line of sight over all four carriageways.
- 3.11 The daytime ambient and night-time ambient and maximum noise levels measured at the unattended location L1 are presented in Table 3.2, below.

Table 3.2 – Daytime and Night-Time Noise Levels facing the Mancunian Way

Day / Date	Noise Level, dB		
	Daytime 0700-2300, L _{Aeq,T}	Night-Time	
		2300-0700h, L _{Aeq, T}	Typical Maximum, L _{Amax,F}
Thursday 11 July	-	71	85
Friday 12 July	73	70	91
Saturday 13 July	72	71	89
Sunday 14 July	72	70	88

4.0 DISCUSSION

- 4.1 With reference to the measured external noise levels, the anticipated free-field noise levels affecting each façade of the proposed three blocks have been calculated using CadnaA® environmental noise modelling software.
- 4.2 The measured / predicted noise levels are presented in Table 3.1 and 3.2, have been used to predict the noise levels external to the different facades of the four proposed residential blocks on the site. These noise levels are identified on the Figures presented in Appendices B, C and D for Blocks A, B and D, respectively.
- 4.3 With reference to the anticipated external noise levels across each façade of the building (as identified above) the minimum required glazing and ventilation sound insulation performances required appropriately control external noise levels to achieve appropriate internal noise levels have been calculated. These required acoustic performances are also presented in the Figures presented in Appendices B, C and D.
- 4.4 The calculations undertaken to confirm the required acoustic performances have been undertaken using the methodology presented in BS8233 and with reference to the architect's elevations and layout plans.
- 4.5 All ventilation requirements have been based on the use of a single ventilator per room. If more than one unit is required, such as may be required to satisfy Building Control requirements, the performance of each unit would need to be increased.

External Envelope

- 4.6 To maintain the sound insulation performance of the external envelope the remainder of the façade construction should have a sound insulation performance of at least 10dB higher than the performance specified for the glazing.
- 4.7 The external envelope will be constructed from a glazed spandrel panel with a plasterboard internal lining and mineral wool insulation in the cavity. The proposed spandrel panel is being laboratory tested and the data will be provided once the testing has been completed. However, calculations indicate that this will achieve a minimum acoustic performance of 53 and 58dBR_w would be achieved depending on the internal lining, and will therefore be appropriate.

APPENDIX A – Acoustic Terminology in Brief

Sound Description

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most sound is made up of many different frequencies.

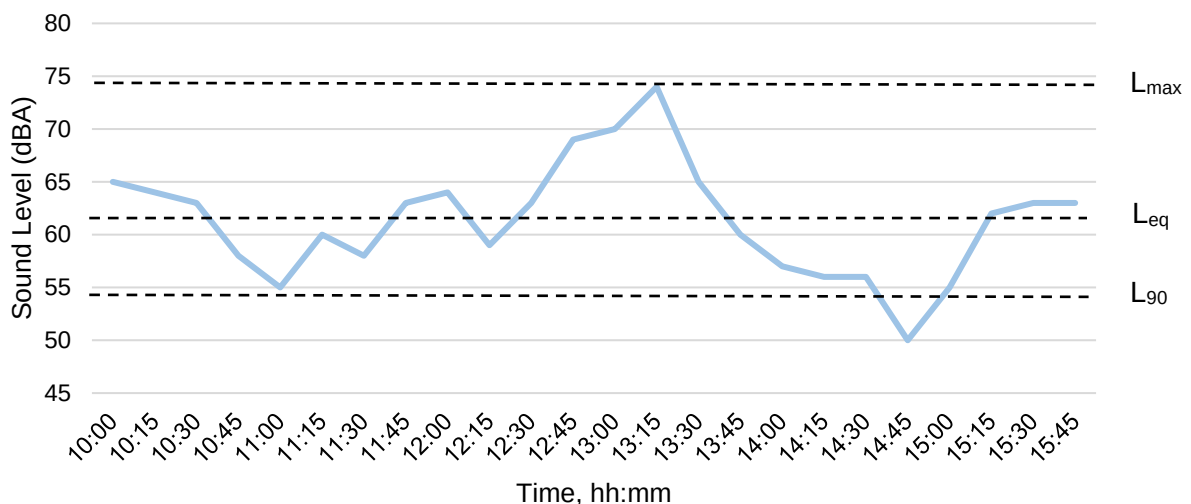
The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The *dBA* weighting emphasises or reduces the importance of certain frequencies within the audible range.

Sound Units

In order to assess environmental noise, measurements are carried out by sampling over specific periods of time, such as fifteen minutes or one hour, the statistically determined results being used to quantify various aspects of the sound.

The figure below shows an example of sound level varying with time. Because of this time variation, the same period of sound can be described by several different levels. The most common of these are described below. It should be noted that in many instances in the main body of text, the unit will be preceded by a *dB* descriptor in the report e.g. $L_{Aeq,T}$ could be written $dBL_{Aeq,T}$.

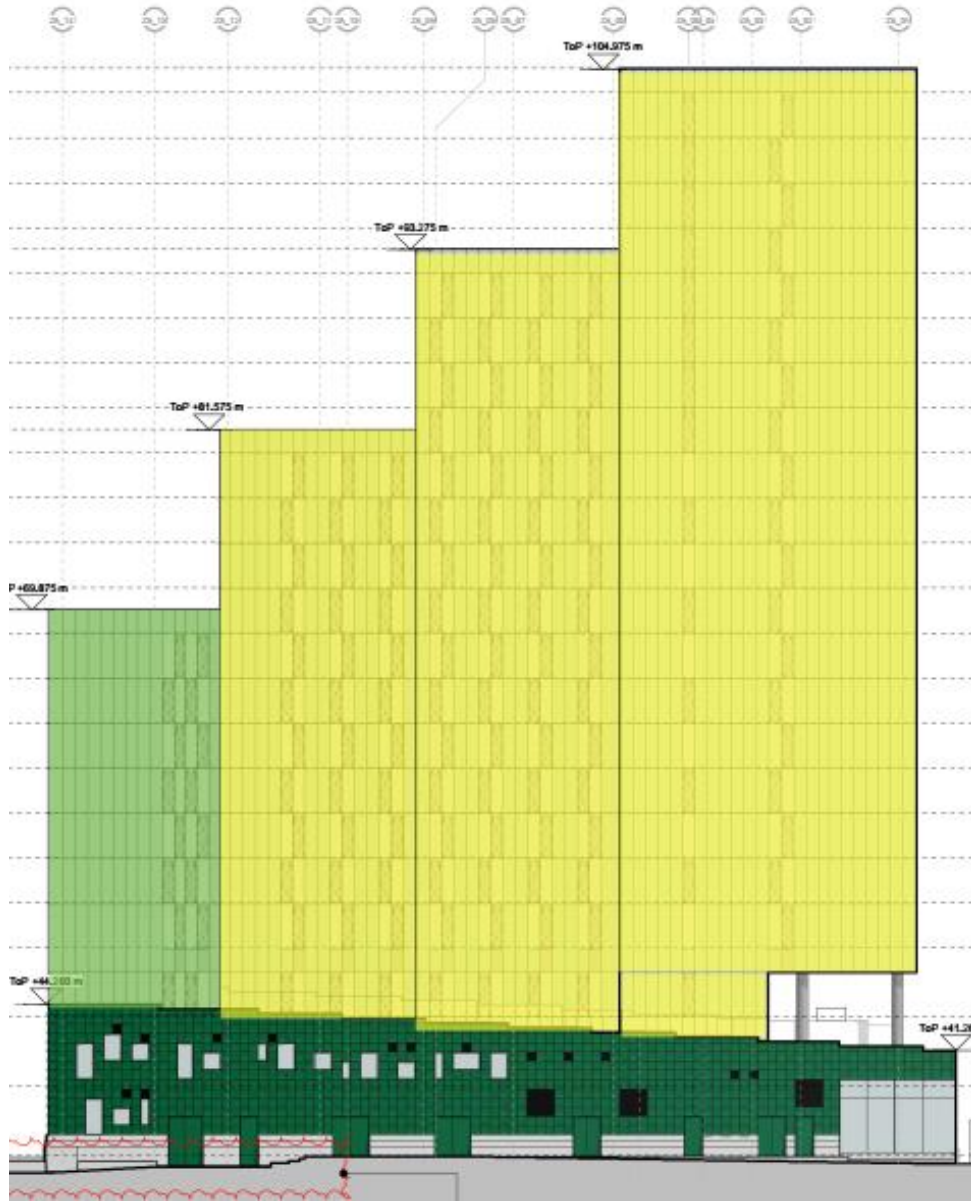
Example of Sound Varying with Time



Unit Type	Acoustic Unit	Description
Ambient Sound Level	$L_{Aeq, T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the “average” sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises and can be considered as the “ambient” noise level.
Maximum Sound level	L_{Amax}	The maximum (A-weighted) sound level measured during a given time. ‘Fast’ or ‘Slow’ meter response should be cited.
Free-field Level	-	This refers to the sound level measured outside, away from reflecting surfaces.
Façade Level	-	This refers to the sound level measured outside, at 1m from a hard-reflecting surface, typically 3dB greater than the free-field level.
Noise reduction coefficient	NRC	A single figure number sometimes used to describe the performance of sound absorbing materials based on a combination of its absorption coefficient at various frequencies.
Noise Rating	NR	A graphical method for assigning a single number rating to a noise spectrum and is often use to specify noise level limits for mechanical services.
Sound reduction index	R_w	Single number rating used to describe the <u>laboratory</u> airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
A road traffic spectrum adaptation term	C_{tr}	Referenced to demonstrate the to the low frequency sound insulation performance of building elements. Makes reference to the A-weighted urban traffic noise spectrum.
Weighted Level Difference	D_w	Single number rating used to describe the on-site airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
Weighted standardized level difference	$D_{nT,w}$	Single number rating used to describe the on-site airborne sound insulation performance properties of a material or building element over a range of frequencies, typically 100-3150Hz, which is calculated in terms of a standardized reverberation time of 0.5 seconds.
Weighted standardized impact sound pressure level	$L'_{nT,w}$	Single number rating used to describe the on-site impact sound insulation performance properties of a floor over a range of frequencies, typically 100-3150Hz, which is calculated in terms of a standardized reverberation time of 0.5 seconds.
Element normalized level difference	$D_{n,e,w}$	Single number rating used to describe the sound insulation performance of small elements.
Background Sound Level	L_{A90}	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting, F, and quoted to the nearest whole number of decibels.

APPENDIX B – Block A

Figure B.1 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Northern Elevation of Block A



Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, L _{Aeq,15h}	Night-time, L _{Aeq,9h}	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dBR _w	48dBR _w / 42dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 44dBD _{n,s,w}
Blue	66-71	60-64	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 41dBD _{n,s,w}
Yellow	63-65	53-59	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 38dBD _{n,s,w}
Green	≤62	≤52	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 33dBD _{n,s,w}

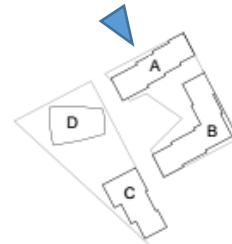
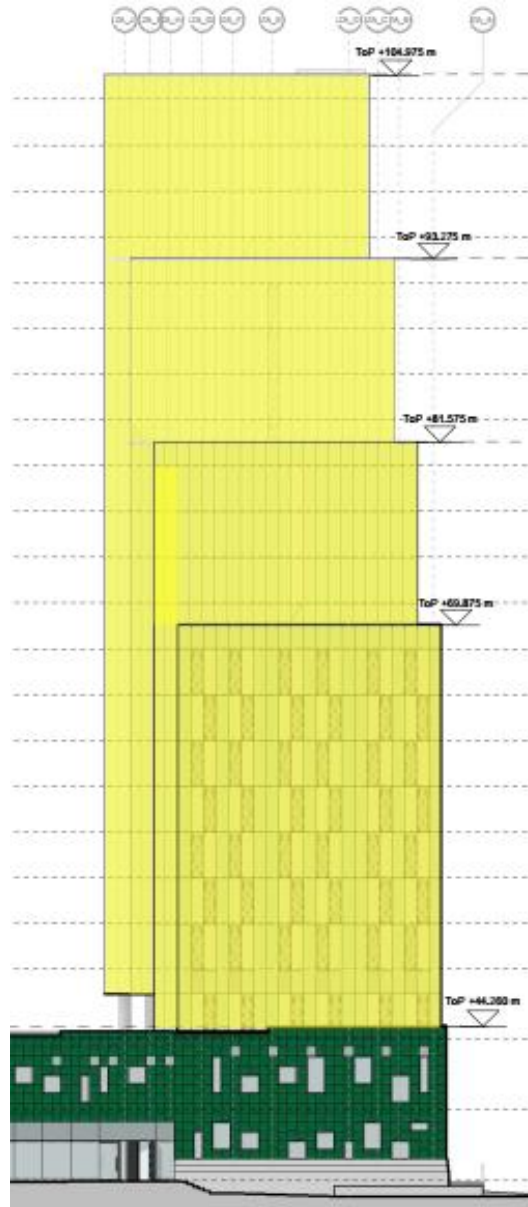


Figure B.2 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Eastern Elevation of Block A



Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, LAeq,16h	Night-time, LAeq,8h	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dB _{Rw}	48dB _{Rw} / 42dB _{Rw} + C _v	MEV and Acoustic Trickle Vent achieving 44dB _{Dn,e,w}
Blue	66-71	60-64	53dB _{Rw}	43dB _{Rw} / 38dB _{Rw} + C _v	MEV and Acoustic Trickle Vent achieving 41dB _{Dn,e,w}
Yellow	63-65	53-59	53dB _{Rw}	43dB _{Rw} / 38dB _{Rw} + C _v	MEV and Acoustic Trickle Vent achieving 38dB _{Dn,e,w}
Green	≤62	≤52	53dB _{Rw}	43dB _{Rw} / 38dB _{Rw} + C _v	MEV and Acoustic Trickle Vent achieving 33dB _{Dn,e,w}

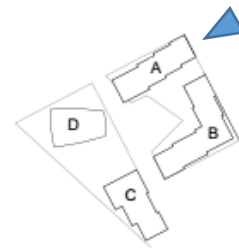
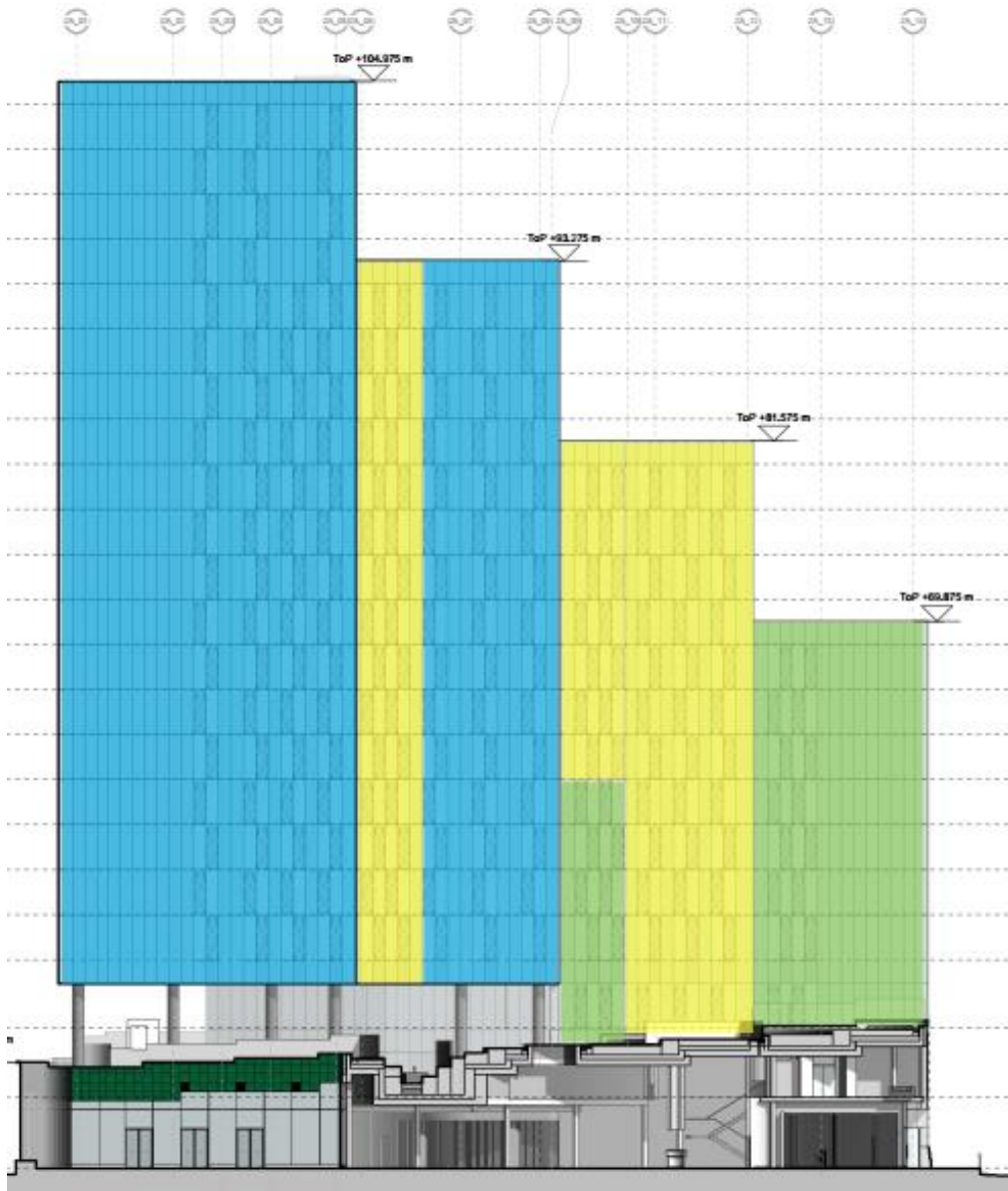


Figure B.3 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Southern Elevation of Block A



Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, LAeq,16h	Night-time, LAeq,8h	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dBR _w	48dBR _w / 42dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 44dBD _{n,e,w}
Blue	66-71	60-64	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 41dBD _{n,e,w}
Yellow	63-65	53-59	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 38dBD _{n,e,w}
Green	≤62	≤52	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 33dBD _{n,e,w}

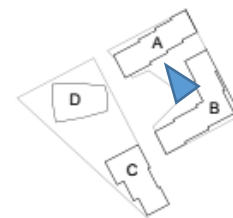
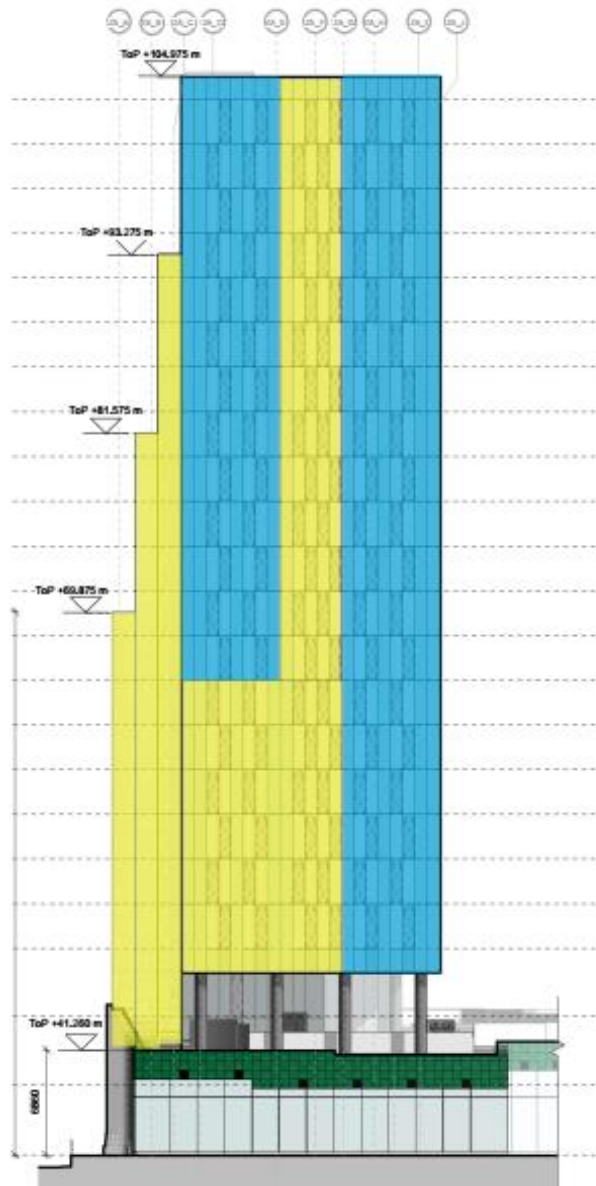


Figure B.4 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Western Elevation of Block A



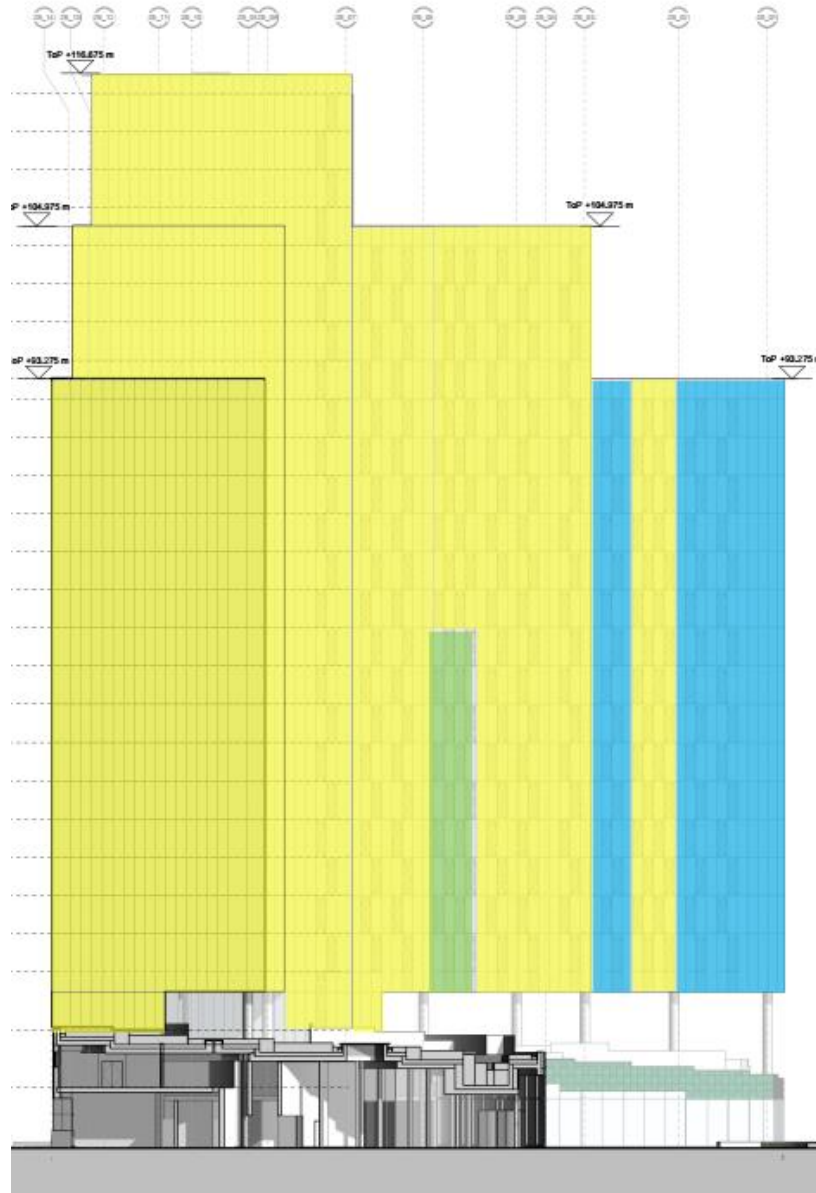
Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, $L_{Aeq,16h}$	Night-time, $L_{Aeq,8h}$	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dBR _w	48dBR _w / 42dBR _w + C _r	MEV and Acoustic Trickle Vent achieving 44dB _{Dn,e,w}
Blue	66-71	60-64	53dBR _w	43dBR _w / 38dBR _w + C _r	MEV and Acoustic Trickle Vent achieving 41dB _{Dn,e,w}
Yellow	63-65	53-59	53dBR _w	43dBR _w / 38dBR _w + C _r	MEV and Acoustic Trickle Vent achieving 38dB _{Dn,e,w}
Green	≤62	≤52	53dBR _w	43dBR _w / 38dBR _w + C _r	MEV and Acoustic Trickle Vent achieving 33dB _{Dn,e,w}



APPENDIX C – Block B

Figure C.1 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Northern Elevation of Block B



Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, $L_{Aeq,16h}$	Night-time, $L_{Aeq,8h}$	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dBR _w	48dBR _w / 42dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 44dB _{Dn,e,w}
Blue	66-71	60-64	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 41dB _{Dn,e,w}
Yellow	63-65	53-59	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 38dB _{Dn,e,w}
Green	≤62	≤52	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 33dB _{Dn,e,w}

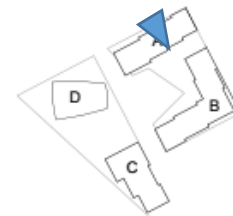


Figure C.2 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Eastern Elevation of Block B



Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, L _{Aeq,15h}	Night-time, L _{Aeq,8h}	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dB _{R'} w	48dB _{Rw} / 42dB _{Rw} + C _{tr}	MEV and Acoustic Trickle Vent achieving 44dB _{Dn,e,w}
Blue	66-71	60-64	53dB _{R'} w	43dB _{Rw} / 38dB _{Rw} + C _{tr}	MEV and Acoustic Trickle Vent achieving 41dB _{Dn,e,w}
Yellow	63-65	53-59	53dB _{R'} w	43dB _{Rw} / 38dB _{Rw} + C _{tr}	MEV and Acoustic Trickle Vent achieving 38dB _{Dn,e,w}
Green	≤62	≤52	53dB _{R'} w	43dB _{Rw} / 38dB _{Rw} + C _{tr}	MEV and Acoustic Trickle Vent achieving 33dB _{Dn,e,w}

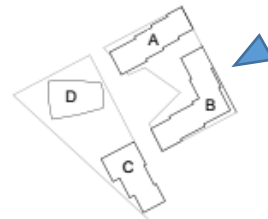
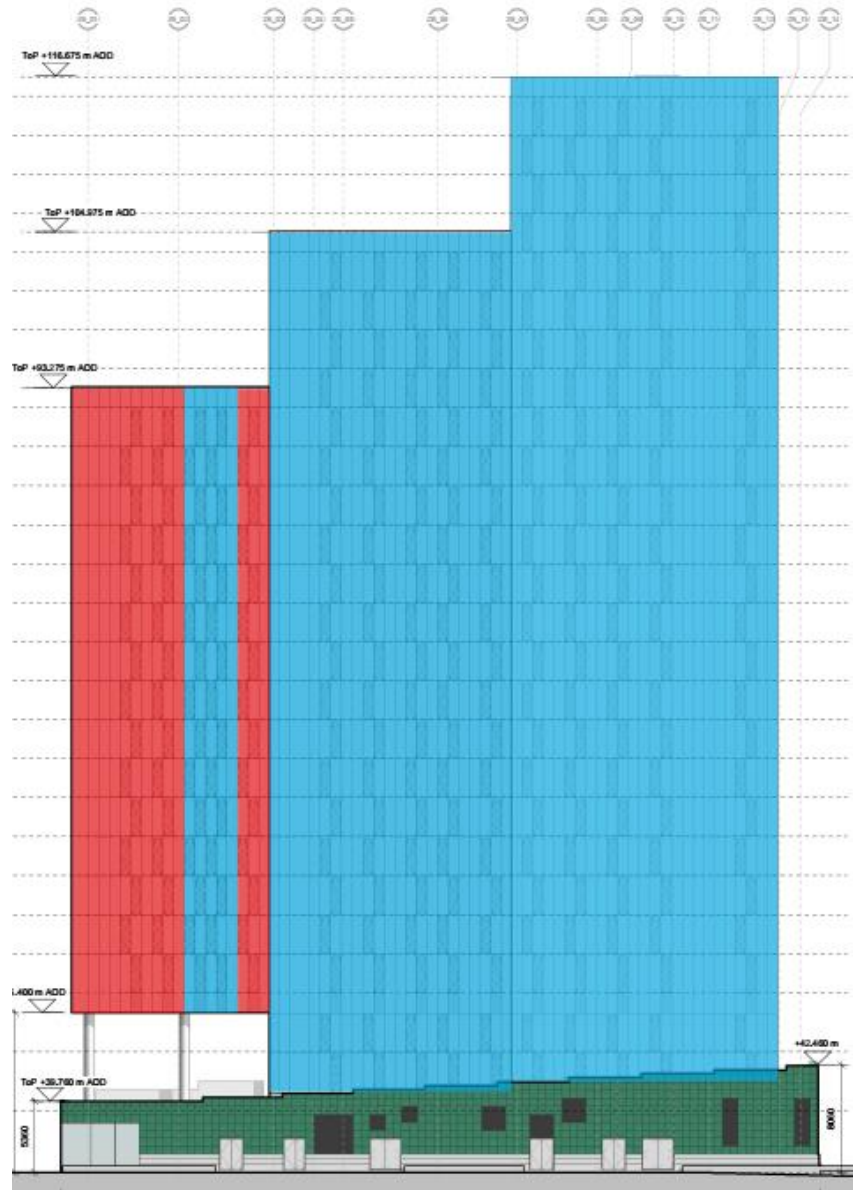


Figure C.3 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Southern Elevation of Block B



Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, LAeq,16h	Night-time, LAeq,8h	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dBR'w	48dBR _w / 42dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 44dBD _{n,e,w}
Blue	66-71	60-64	53dBR'w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 41dBD _{n,e,w}
Yellow	63-65	53-59	53dBR'w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 38dBD _{n,e,w}
Green	≤62	≤52	53dBR'w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 33dBD _{n,e,w}

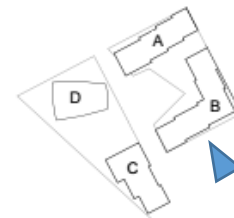
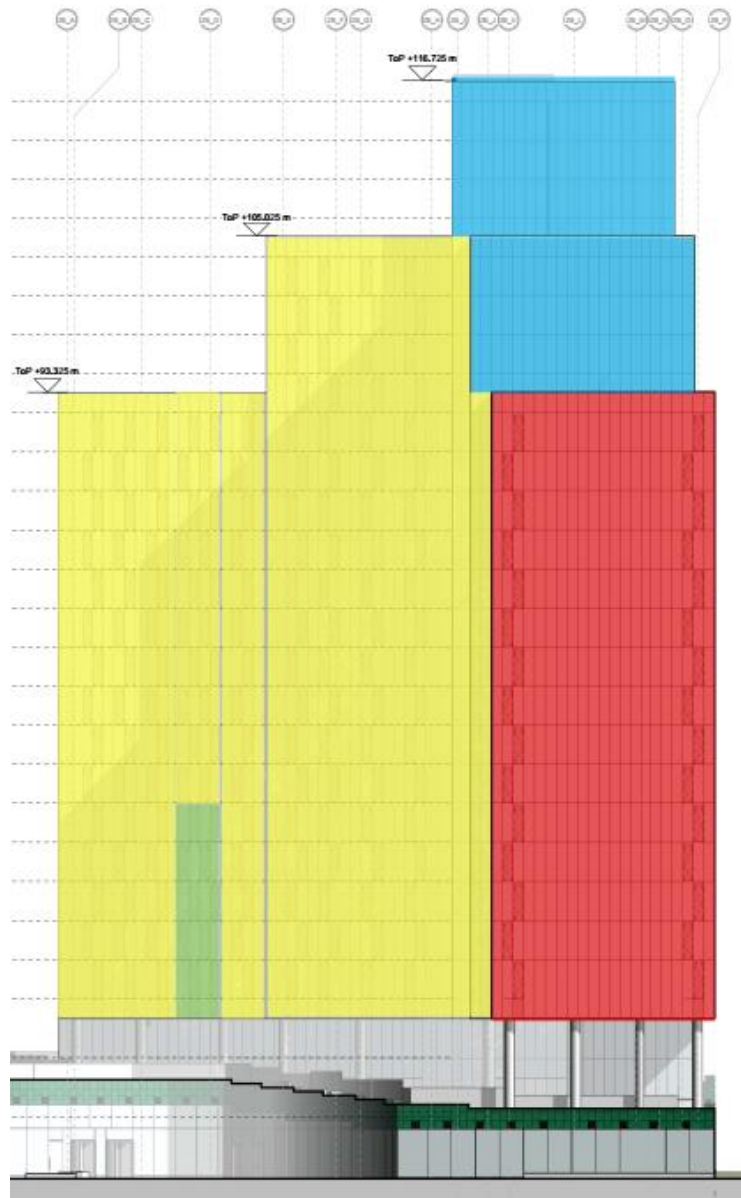
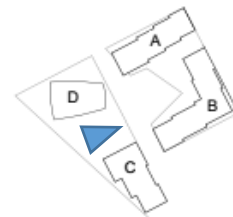


Figure C.4 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Western Elevation of Block B



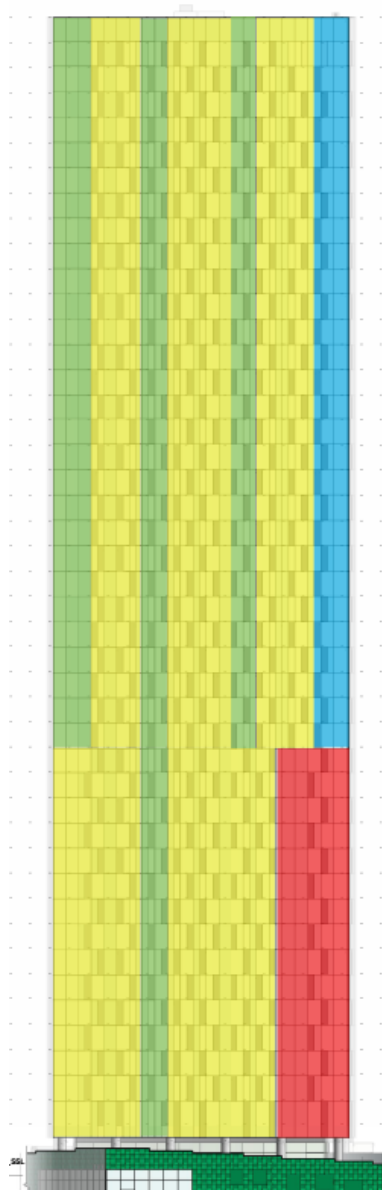
Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, $L_{Aeq,16h}$	Night-time, $L_{Aeq,8h}$	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dBR _w	48dBR _w / 42dBR _w + C_{tr}	MEV and Acoustic Trickle Vent achieving 44dBD _{n,e,w}
Blue	66-71	60-64	53dBR _w	43dBR _w / 38dBR _w + C_{tr}	MEV and Acoustic Trickle Vent achieving 41dBD _{n,e,w}
Yellow	63-65	53-59	53dBR _w	43dBR _w / 38dBR _w + C_{tr}	MEV and Acoustic Trickle Vent achieving 38dBD _{n,e,w}
Green	≤62	≤52	53dBR _w	43dBR _w / 38dBR _w + C_{tr}	MEV and Acoustic Trickle Vent achieving 33dBD _{n,e,w}



APPENDIX D – Block D

Figure D.1 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Northern Elevation of Block D



Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, $L_{Aeq,15h}$	Night-time, $L_{Aeq,5h}$	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dBR _w	48dBR _w / 42dBR _w + C _r	MEV and Acoustic Trickle Vent achieving 44dBD _{n,r,w}
Blue	66-71	60-64	53dBR _w	43dBR _w / 38dBR _w + C _r	MEV and Acoustic Trickle Vent achieving 41dBD _{n,r,w}
Yellow	63-65	53-59	53dBR _w	43dBR _w / 38dBR _w + C _r	MEV and Acoustic Trickle Vent achieving 38dBD _{n,r,w}
Green	≤62	≤52	53dBR _w	43dBR _w / 38dBR _w + C _r	MEV and Acoustic Trickle Vent achieving 33dBD _{n,r,w}

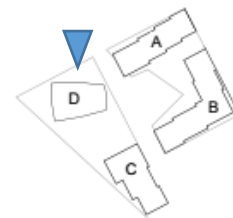
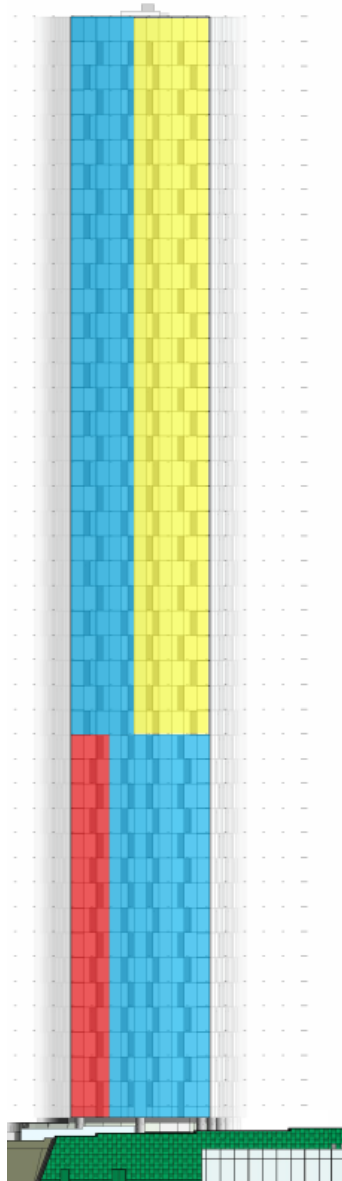


Figure D.2 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Eastern Elevation of Block D

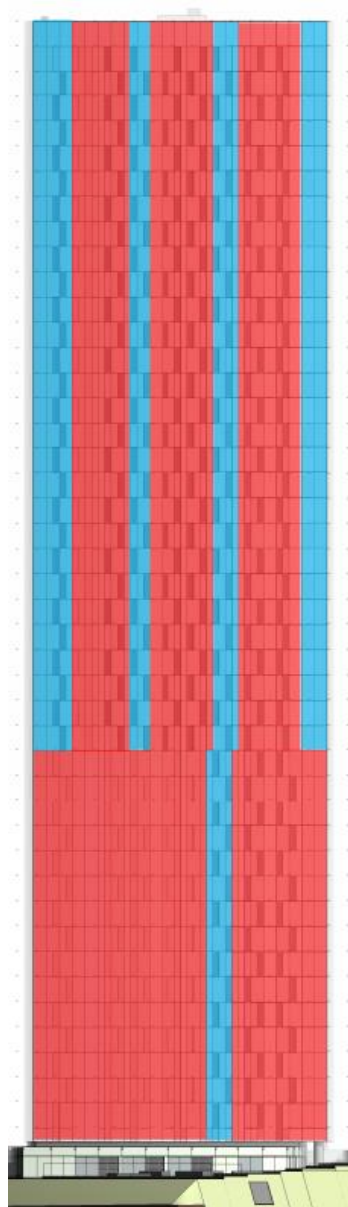


Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, L _{Aeq,16h}	Night-time, L _{Aeq,8h}	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dB _{Rw}	48dB _{Rw} / 42dB _{Rw} + C _{tr}	MEV and Acoustic Trickle Vent achieving 44dB _{Dn,e,w}
Blue	66-71	60-64	53dB _{Rw}	43dB _{Rw} / 38dB _{Rw} + C _{tr}	MEV and Acoustic Trickle Vent achieving 41dB _{Dn,e,w}
Yellow	63-65	53-59	53dB _{Rw}	43dB _{Rw} / 38dB _{Rw} + C _{tr}	MEV and Acoustic Trickle Vent achieving 38dB _{Dn,e,w}
Green	≤62	≤52	53dB _{Rw}	43dB _{Rw} / 38dB _{Rw} + C _{tr}	MEV and Acoustic Trickle Vent achieving 33dB _{Dn,e,w}



Figure D.3 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Southern Elevation of Block D



Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, $L_{Aeq,16h}$	Night-time, $L_{Aeq,8h}$	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dB _{Rw}	48dB _{Rw} / 42dB _{Rw} + C_{tr}	MEV and Acoustic Trickle Vent achieving 44dB _{BDn,e,w}
Blue	66-71	60-64	53dB _{Rw}	43dB _{Rw} / 38dB _{Rw} + C_{tr}	MEV and Acoustic Trickle Vent achieving 41dB _{BDn,e,w}
Yellow	63-65	53-59	53dB _{Rw}	43dB _{Rw} / 38dB _{Rw} + C_{tr}	MEV and Acoustic Trickle Vent achieving 38dB _{BDn,e,w}
Green	≤62	≤52	53dB _{Rw}	43dB _{Rw} / 38dB _{Rw} + C_{tr}	MEV and Acoustic Trickle Vent achieving 33dB _{BDn,e,w}

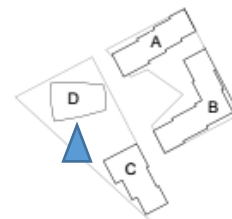
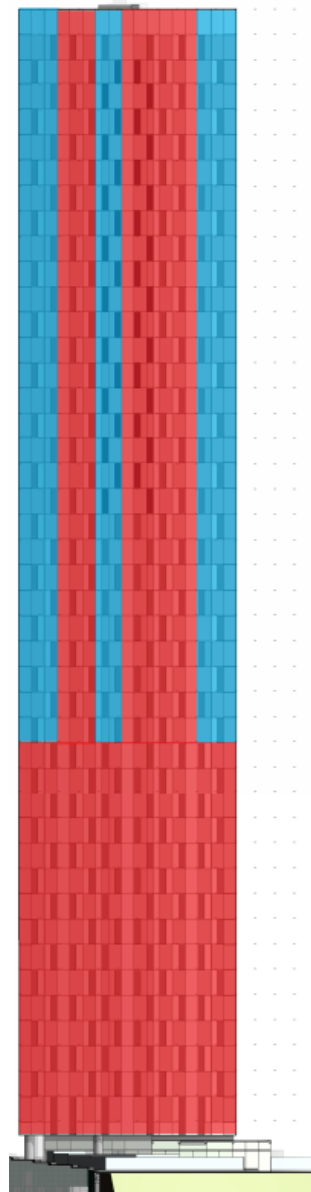


Figure D.4 – Anticipated Free-field External Noise Levels and Required Acoustic Performance of Glazing and Ventilators on the Western Elevation of Block D



Key:

Colour	External Ambient Noise Levels, dB		Sound Insulation Performance		
	Daytime, L _{Aeq,16h}	Night-time, L _{Aeq,8h}	External Wall	Glazing	Ventilator
Red	72-75	65-68	58dBR _w	48dBR _w / 42dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 44dB _{Dn,e,w}
Blue	66-71	60-64	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 41dB _{Dn,e,w}
Yellow	63-65	53-59	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 38dB _{Dn,e,w}
Green	≤62	≤52	53dBR _w	43dBR _w / 38dBR _w + C _{tr}	MEV and Acoustic Trickle Vent achieving 33dB _{Dn,e,w}

