

VULCAN WORKS, MANCHESTER

FAÇADE SOUND INSULATION ASSESSMENT

REPORT REFERENCE NO. J005675-8954-JW-01

JULY 2025

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Document Control Sheet

Details of Assessment	
Client	Thomasons
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Issue	Date	Author	Remark	Status
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	Name	Position
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This report has been prepared based upon a scope of works and associated resources agreed between the client and Philip Dunbavin Acoustics Ltd (PDA). This report has been prepared with all reasonable skill, care and diligence and has been based upon the interpretation of data collected. This has been accepted in good faith as being accurate and valid at the time of the collection. This report has been based solely on the specific design assumptions and criteria stated herein.

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1.0 SUMMARY

This report has been prepared by Philip Dunbavin Acoustics Ltd (PDA) on behalf of Thomasons to compare the predicted sound insulation performance of the proposed new façade cladding at Vulcan Works, Pollard Street, Manchester to the predicted façade sound insulation of the existing / former cladding system.

The predictions in Section 2.0 give the following sound insulation performance predictions for existing and proposed cladding systems:

Table 1. Sound insulation (SI) performance predictions for existing and proposed cladding system

SI Performance Indicator	Timber Cladding Wall	
	Existing	Proposed
R_w dB	53	54
R_w+C_{tr} dB	43	43

As shown in the table above the existing cladding sound insulation performance has been exceeded or met by the proposed external wall system and therefore is considered sufficient.

2.0 FAÇADE SOUND INSULATION ASSESSMENT

The assessment is based on a section drawing provided by Thomasons; the drawing reference is 10349 - 005 T1.

2.1 Timber Cladding Wall – Existing

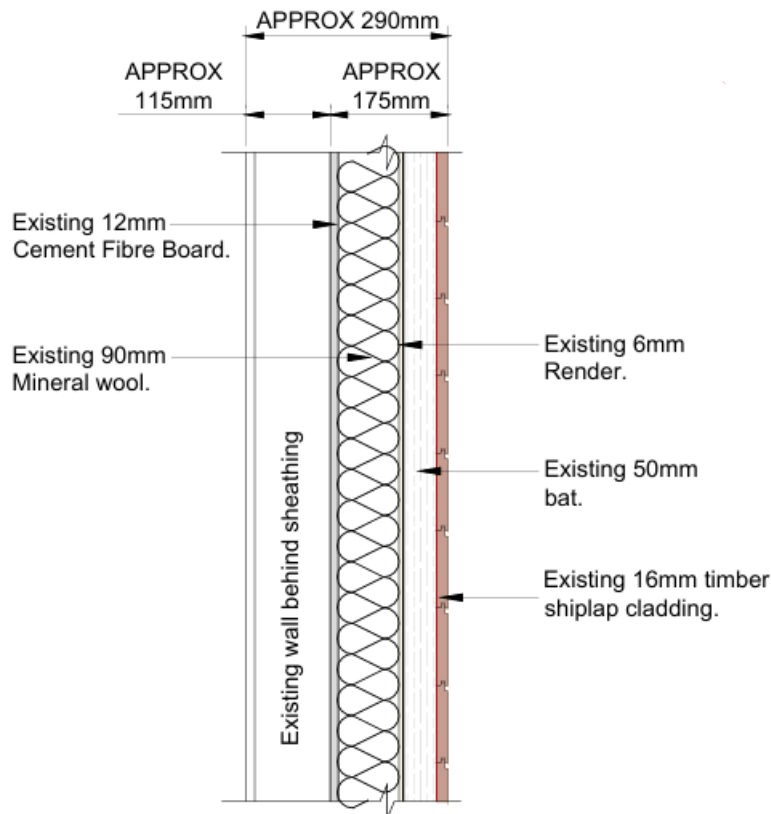


Figure 1: Existing Timber Cladding Wall System

Insul ® proprietary sound insulation prediction software has been utilised to assess the sound insulation of the said system. The system as modelled in Insul ® would be equivalent to the following:

- 12mm cement fibre board
- 90mm mineral wool
- 6mm render
- 50mm batten
- 16mm timber shiplap cladding

The performance prediction sheet is given in Appendix B and the overall predicted sound insulation performance given is as follows:

$R_w = 53 \text{ dB}$

$R_w + C_{tr} = 43 \text{ dB}$

2.2 Timber Cladding Wall - Proposed

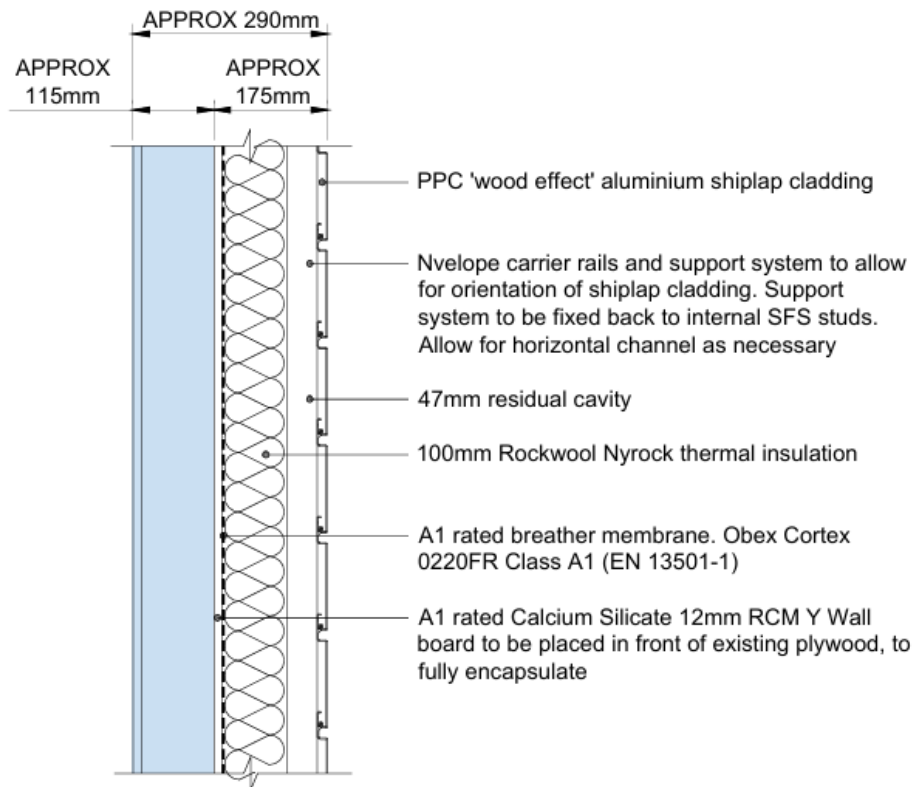


Figure 2: Proposed Timber Wall System

Insul ® proprietary sound insulation prediction software has been utilised to assess the sound insulation of the said system. The system as modelled in Insul ® would be equivalent to the following:

- Calcium Silicate 12mm RCM Y Wall board
- 0.38mm A1 rated breather membrane
- 100mm Rockwool Nyrock thermal insulation
- 47mm residual cavity
- Aluminium shiplap cladding (assumed to 3mm thick)

The performance prediction sheet is given in Appendix B2 and the overall predicted sound insulation performance given is as follows:

$R_w = 54 \text{ dB}$

$R_w + C_{tr} = 43 \text{ dB}$

APPENDIX A – DEFINITION OF ACOUSTIC TERMS (ARCHITECTURAL)

The decibel

This is the basic unit of noise, denoted dB.

A Weighting

This is a weighting process which simulates the human ear's different sensitivity at different frequencies. A weighting can be shown two typical ways, 50 dB(A) L_{eq} or 50 dB L_{Aeq} . Both mean the same thing. (See below for a definition of L_{eq}). The dB(A) level can be regarded as the overall level perceived by human beings.

L_{eq} and $L_{eq}(s)$

This is the equivalent continuous noise level which contains the same acoustic energy as the actual time-varying sound. In other words it is a kind of average noise level. It is denoted dB L_{eq} , or for A-weighted figures dB(A) L_{eq} or dB L_{Aeq} . It can also be expressed in terms of frequency analysis (see later). $L_{eq}(s)$ is the sample L_{eq} level.

L_n

This is the level exceeded for n% of the time. It is denoted dB L_n , or for A-weighted figures dB(A) L_n or dB L_{An} . It can be expressed in terms of frequency analysis (see later). L_{90} is the level exceeded for 90% of the time and is a measure of the lowest level typically reached. L_{10} is the level exceeded for 10% of the time and is the highest level typically reached. L_{50} is the level exceeded for 50% of the time and, mathematically it is the median.

L_{max}

This is the maximum level reached during a measurement period. The "time constant", or the ability of the equipment to respond to impulses is usually expressed along with it, e.g. "Fast", "Slow", etc. It is denoted dB L_{max} or, for A-weighted figures dB(A) L_{max} , dB L_{Amax} , etc. It can also be expressed in terms of frequency analysis.

Reverberation Time

This is the most common way of expressing a room's basic acoustic character. It is defined as the duration required for the space-averaged sound energy density in an enclosure to decrease by 60 dB after the source emission has stopped, denoted as RT_{60} . It is usually impractical to measure a full 60 dB dynamic range in the field; a smaller dynamic range may be used extrapolated to a decay time of 60 dB. Common derivations include a range between 5 dB and 25 dB below the initial level, which is labelled T_{20} , or the range between 5 dB and 35 dB below the initial level, labelled as T_{30} .

Frequency Analysis

Whereas dB(A) gives a very useful overall figure, it has its limitations in that it cannot be used to model or predict the effect of noise control and mitigation as this nearly always has radically different performance at different frequencies.

Frequency analysis expresses an overall noise level at each frequency or band of frequencies in the audible range. Octave band analysis divides the audible range into 10 bands from 31.5 Hz to 16 kHz and the noise level in each band can be expressed in any form e.g. L_{eq} , L_{90} , L_{max} etc. One third octave band analysis uses 30 bands.

Narrow band analysis takes the process to resolutions of less than 1 Hz. This is useful for identifying the existence of tones (whines, hums, etc.) and in pin-pointing the sources.

Sound reduction index (R)

This is a measure in decibels (dB) of the sound insulation of a particular construction. It is a laboratory measured parameter independent of area, and of receiving room conditions. The sound reduction index is the value produced from laboratory tests on a construction. When tested in a laboratory, results of R are obtained over a range frequencies in 1/3rd and/or full octave bands. These may then be weighted in accordance with BS EN ISO 717: 1997: Part 1 to give the overall *Weighted Sound Reduction Index* R_w . Where sound reduction with respect to road traffic noise is required the frequency weighting may be adapted using the C_{tr} spectrum adaptation term. In this case the single figure value is given in terms of $R_w + C_{tr}$.

Standardised level difference (D_{nT})

This is the level difference adjusted to assume a standard reverberation time of 0.5 seconds in the receiving room so that partitions can be compared independent of the furnishing and surface finishes of the rooms. The measure is generally used in residential testing as 0.5 seconds is taken as the approximate reverberation time of a furnished living room or bedroom. The D_{nT} is usually quoted for 1/3rd octave bands between 100 Hz and 3150 Hz.

Weighted standardised level difference ($D_{nT,w}$)

The $D_{nT,w}$ is a single figure expression used to describe the sound insulation of a partition. The weighting system used to obtain the single figure $D_{nT,w}$ from the 1/3rd octave D_{nT} values is given in BS EN ISO 717: Part 1. The $D_{nT,w}$ is used for expressing sound insulation measured “in the field”, and is part of the term used in Approved Document E 2003, guidance to the Building Regulations for the assessment of performance of separating elements between residences.

Spectrum adaptation terms (C, C_{tr})

These terms are single figure values which are added to a single figure R_w or D_w term to adapt the frequency weighting for different source noise spectra. Adding the C_{tr} term to a weighted parameter approximates to the human perceived sound insulation of an element when subjected to road traffic noise. The C_{tr} term may be used to determine a single figure approximation of sound insulation against road traffic noise. The C_{tr} term is part of the term used in Approved Document E: 2003 of the Building Regulations for the assessment of performance of separating elements between residences.

Flanking

Flanking is the term used to describe how sound gets from one room to another by routes other than via the wall or floor directly separating them. Such flanking paths around a party wall would be the internal leaf of the external wall or the roof void, plus any air gaps at junctions. The sound insulation of flanking paths is very important. If the insulation is poor it can result in a poor built performance in terms of sound insulation, even if the party walls or floors themselves are adequate. When a measurement of sound insulation is made in a building as opposed to an acoustic laboratory, it will include flanking sound transmission. Standards for sound insulation in residential properties now require testing of $D_{nT,w} + C_{tr}$ values which include sound transmission via flanking paths.

APPENDIX B – INSUL® SOUND INSULATION PERFORMANCE PREDICTION SHEETS

Sound Insulation Prediction (v9.0.24)

Program copyright Marshall Day Acoustics 2017

Margin of error is generally within $R_w \pm 3$ dB

- Key No. 5527

Job Name:

Job No.:

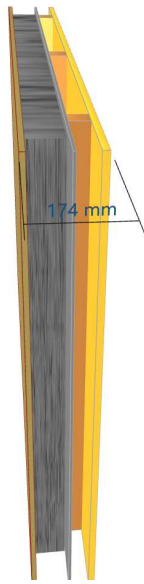
Initials:Naomi Bolton

Date:07/07/2025

File Name:Vulcan Existing.ixl



Notes:



R_w 53 dB

C -3 dB

C_{tr} -10 dB

Mass-air-mass resonant frequency = 64 Hz, 151 Hz

Panel Size = 2.7 m x 4.0 m

Partition surface mass = 38.4 kg/m²

System description

Panel 1 : 1 x 12 mm RCM CemBoard (cement particle board)

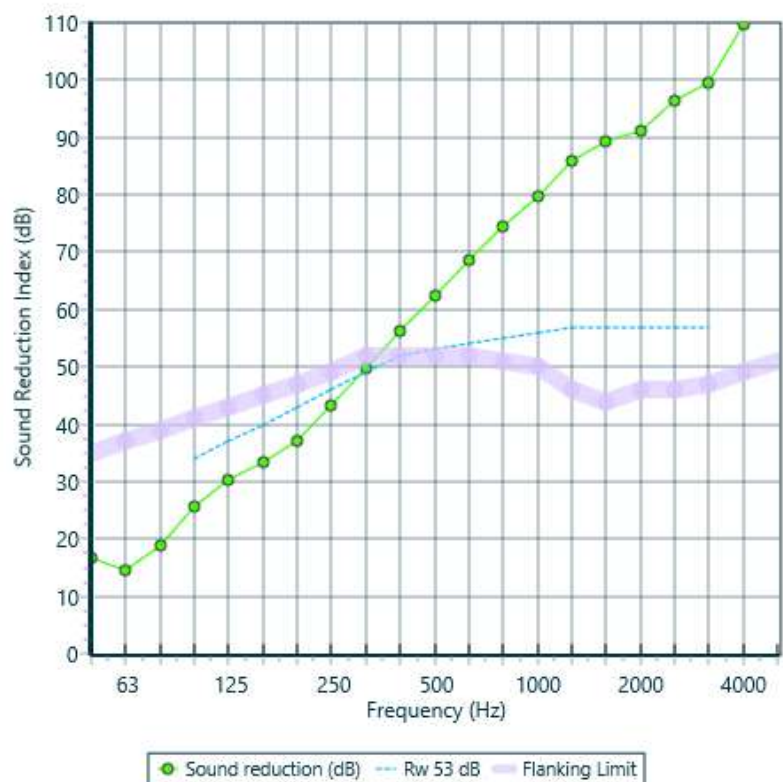
Frame: None (no connections) (90 mm x 45 mm), Stud spacing 600 mm ; Cavity Width 90 mm , 1 x Rockwool (33kg/m3) Thickness 90 mm

Panel 2 : 1 x 6 mm Sand/Cement render (plaster)

Frame: Timber stud (50 mm x 45 mm), Stud spacing 600 mm ; Cavity Width 50 mm

Panel 3 : 1 x 16 mm Particle Board

freq.(Hz)	R(dB)	R(dB)
50	17	
63	15	16
80	19	
100	26	
125	30	29
160	33	
200	37	
250	43	41
315	50	
400	56	
500	62	60
630	69	
800	74	
1000	80	78
1250	86	
1600	89	
2000	91	91
2500	96	
3150	99	
4000	110	104
5000	120	



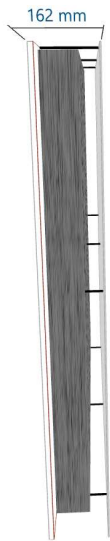
Sound Insulation Prediction (v9.0.24)

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within $R_w \pm 3$ dB
- Key No. 5527

Job Name:
Job No.: Initials:Naomi Bolton
Date:09/07/2025
File Name:Vulcan Proposed.ixl



Notes:



Rw 54 dB
C -4 dB
Ctr -11 dB

Mass-air-mass resonant frequency = 57 Hz

Panel Size = 2.7 m x 4.0 m

Partition surface mass = 26.7 kg/m²

System description

Panel 1 : 1 x 12 mm BluClad (calcium silicate) + 1 x 0.4 mm dBcover Ceracoustic 3.0 (GB12.5-membrane-GB12.5)

Frame: Point Connection (1.5E2 mm x 45 mm), Stud spacing 600 mm ; Cavity Width 147 mm , 1 x Rockwool (33kg/m3) Thickness 100 mm
Panel 2 : 1 x 3 mm Aluminium

freq.(Hz)	R(dB)	R(dB)
50	14	
63	11	14
80	18	
100	25	
125	31	28
160	36	
200	41	
250	45	44
315	49	
400	53	
500	55	55
630	58	
800	60	
1000	61	61
1250	62	
1600	63	
2000	61	63
2500	68	
3150	68	
4000	61	63
5000	62	

