www.aeservices.co.nz
office@aeservices.co.nz
Auckland +64 9 917 0369
Wellington +64 4 890 0122
Christchurch +64 3 377 8952

File Ref: AC18315 – 02 – R1

13 August 2019

M. Flewellen
Resene Construction Systems
5 Venture Place
Middleton
CHRISTCHURCH 8024

Email: mark.flewellen@reseneconstruction.co.nz

Dear Mark

Re: Resene Integra Intertenancy walls – Acoustic Review

As requested we have summarised our previous advice regarding to acoustic performance of the Resene Integra Lightweight Concrete Intertenancy systems, and reviewed the expected performance, when considering a number of other construction variables. The information below relates to wall systems described in the Resene Integra Lightweight Concrete Intertenancy System book hereafter referred to as the Intertenancy Booklet, and assumes the systems are constructed in accordance with the guidelines outlined on pages 10 – 13 of the Intertenancy Booklet, including the application of acoustic sealant.

1.0 TESTED SYSTEM

Auckland Uniservices Limited tested two Resene Integra Lightweight Concrete Intertenancy Systems in accordance with ISO standard *10140-2:2010(E) Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation.* STC ratings were determined in accordance with *ASTM E413 Classification for Rating Sound Insulation* and R_w ratings were determined in accordance with *ISO 717-1 Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation.*

The tested systems and their respective tested ratings are listed below:

INTLA120a

- 1 layer of 10 mm GIB® Standard plasterboard / 90 mm timber stud / Pink Batts R2.2 insulation / 20 mm rubber isolated L-brackets / 50 mm Integra Panel / 20 mm rubber isolated L-brackets / Pink Batts R2.2 insulation / 90 mm timber stud / 1 layer of 10 mm GIB® Standard plasterboard

This system has a tested STC rating of 64 and a tested R_w rating of 62.

INTLA120c

- 2 layers of 10 mm GIB® Standard plasterboard / 90 mm timber stud / Pink Batts R2.2 insulation / 20 mm rubber isolated L-brackets / 50 mm Integra Panel / 20 mm rubber isolated L-brackets / Pink Batts R2.2 insulation / 90 mm timber stud / 2 layers of 10 mm GIB® Standard plasterboard

This system has a tested STC rating of 67 and a tested R_w rating of 66.

2.0 MODELLED SYSTEMS

In addition to the tested systems above, the acoustic rating of a number of variations were considered further. These were based on the results of the above tested systems in conjunction with Insul Version 9.0.20 (sound insulation prediction software).

2.1 Wall systems

The expected STC and R_w ratings of the three systems described are listed below.

INTLA120b

- 1 layer of 13 mm GIB® Standard plasterboard / 90 mm timber stud / Pink Batts R2.2 insulation / 20 mm rubber isolated L-brackets / 50 mm Integra Panel / 20 mm rubber isolated L-brackets / Pink Batts R2.2 insulation / 90 mm timber stud / 1 layer of 13 mm GIB® Standard plasterboard

This system has a modelled STC rating of 66 and R_w rating of 65.

INTLA120d

- 1 layer of 10 mm GIB® Noiseline plasterboard / 90 mm timber stud / Pink Batts R2.2 insulation / 20 mm rubber isolated L-brackets / 50 mm Integra Panel / 20 mm rubber isolated L-brackets / Pink Batts R2.2 insulation / 90 mm timber stud / 1 layer of 10 mm GIB® Noiseline plasterboard

This system has a modelled STC rating of 66 and R_w rating of 65.

INTLA120e

- 1 layer of 13 mm GIB® Noiseline plasterboard / 90 mm timber stud / Pink Batts R2.2 insulation / 20 mm rubber isolated L-brackets / 50 mm Integra Panel / 20 mm rubber isolated L-brackets / Pink Batts R2.2 insulation / 90 mm timber stud / 1 layer of 13 mm GIB® Noiseline plasterboard

This system has a modelled STC rating of 67 and R_w rating of 67.

2.2 Variations to the wall systems

2.2.1 Steel framing

We expect that the above wall systems would perform the same or slightly better if the timber framing outlined above was substituted for 90 mm x 37 mm x 0.55 mm steel framing.

2.2.2 Alternative wall linings

The GIB® plasterboard linings above could be substituted for other brands of plasterboard. However, in order to retain the acoustic rating of the wall the substituted product would need to have a minimum surface mass as listed in table 2.1 below.

Table 2.1 – Acceptable wall lining substitutions

Specified lining	Minimum surface mass of plasterboard substitution
10mm GIB® Standard plasterboard	6.4 kg/m^2
13mm GIB® Standard plasterboard	8.4 kg/m^2
10mm GIB® Noiseline plasterboard	8.6 kg/m^2
13mm GIB® Noiseline plasterboard	12.5 kg/m^2

2.2.3 Alternative acoustic absorption

The systems which were tested at Auckland Uniservices included Pink Batts R2.2 fibrous insulation acoustic absorption installed within the timber framing on each side of the wall. However, page 8 of the Intertenancy Booklet lists Pink Batts R1.8 as the minimum specification. While this is different than what was tested we have undertaken additional calculations and can confirm that the STC and R_w ratings of the wall systems listed above will be retained with Pink Batts R1.8 insulation.

Overall, in order to achieve the stated ratings the acoustic absorption product would need to be fibrous (glass fibre, polyester fibre, wool etc) and would need to have a minimum thickness of 75 mm.

Examples of other suitable products include:

- Autex Greenstuff R2 Wall Pads
- Terra Lana R2.2 Wall Blanket
- Earthwool R-1.5 75 mm Wall Batt
- Earthwool glasswool 75 mm Acoustic Wall Segments

2.2.4 Intergra panel thickness

The systems described above have been tested and modelled with a 50 mm central Integra Panel. If a 75 mm Integra central panel was substituted into the above systems, we would expect the relative STC / R_w ratings would increase by 1 – 2 dB.

2.2.5 Variations in framing

We understand that the wall system may be used in a variety of situations and as such there will be differing requirements for the framing. We have considered the expected airborne noise transmission for each of the wall types listed above with regard to the following variations in framing:

- Reduction in stud centres
- Different wall heights
- Increase in stud size

Provided there is no connection between the central barrier and either framed wall (other than the resilient acoustic mounts), we expect the tested or modelled sound insulation ratings of the wall systems will be achieved where the following parameters are complied with:

- Stud centres between 300 mm and 600 mm

- Wall heights between 2,400 mm and 12,000 mm
- Stud size between 90 mm and 200 mm

3.0 FLANKING PATHS

While the wall systems in isolation will achieve the relative STC / R_w ratings outlined above, the performance achieved in a given practical situation will depend on the wall detailing. We have therefore reviewed the following junction details in the Intertenancy Booklet to ensure that detailing issues do not degrade the acoustic rating of the wall system:

- Wall Projection – Plan View - Detail 34.19.43
- T-Junction – Internal Wall meeting Intertenancy Wall - Detail 34.19.60
- T-Junction – Inter-tenancy wall meeting External Wall - Detail 34.19.61
- T-Junction – Inter-tenancy wall meeting External Wall - Detail 34.19.70
- Roof Valley - Detail 34.19.91
- Roof Ridge - Detail 34.19.92
- Roof Parapet - Detail 34.19.93
- Sloping Roof End - Detail 34.19.94
- Eave - Detail 34.19.96

We expect that where the systems are constructed in accordance with the details listed above that the ratings of the walls will be maintained. Key details are outlined in the following sections.

3.1 Intertenancy to external wall detail

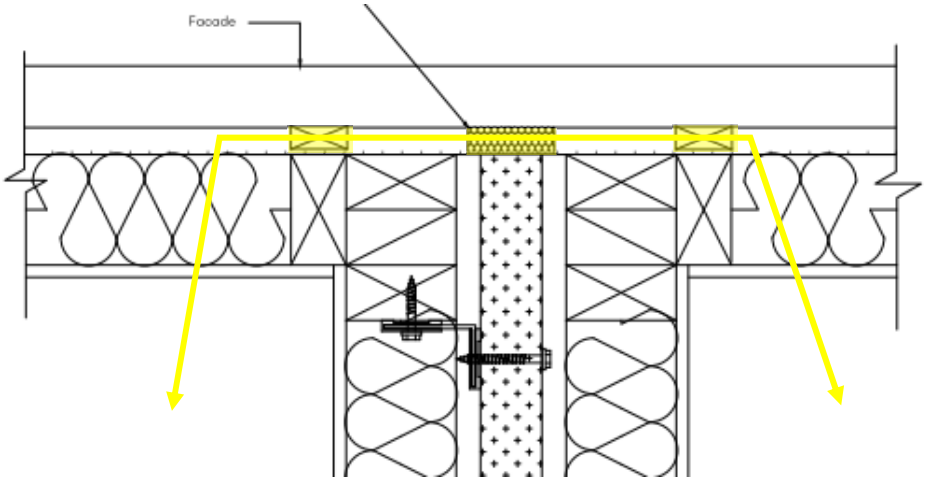

Figure 3.3 – Typical intertenancy to façade detail

Based on the solid timber strapping and mineral wool ceramic fibre cavity insulation located at the end of the Integra panel, continuous along the wall line (as indicated in yellow in figure 3.3 above). We expect flanking noise transmitted via the path indicated in yellow to be well controlled and the rating of the wall to be maintained.

3.2 T-Junction – Intertenancy wall meeting Floor

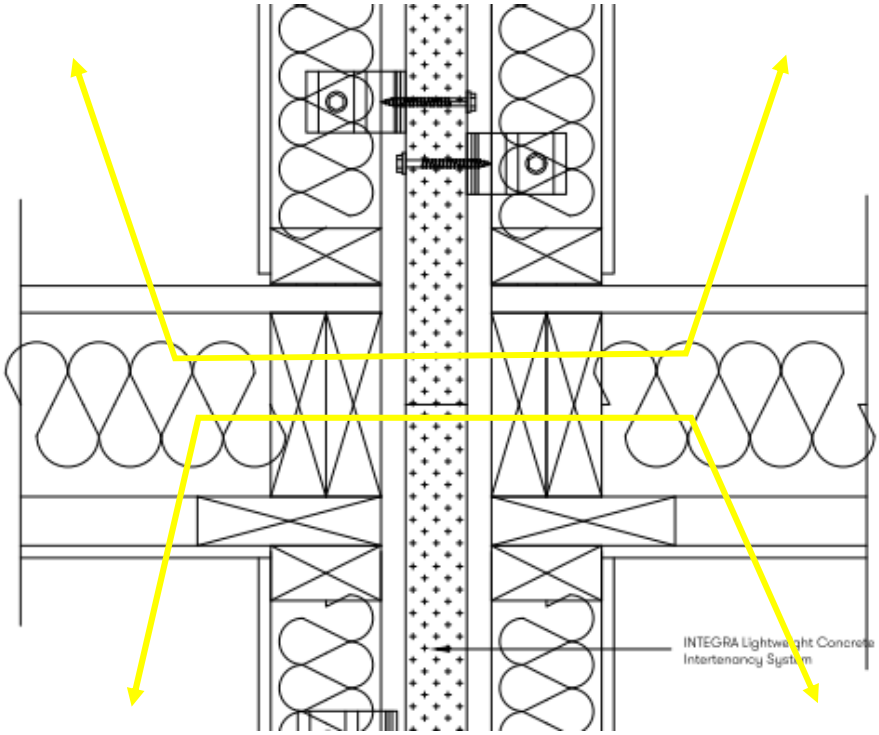

Figure 3.4 – Midfloor junction

Based on the solid timber blocking we expect flanking noise transmitted via the path indicated in yellow to be well controlled and the rating of the wall to be maintained.

3.2.1 Roof Detail

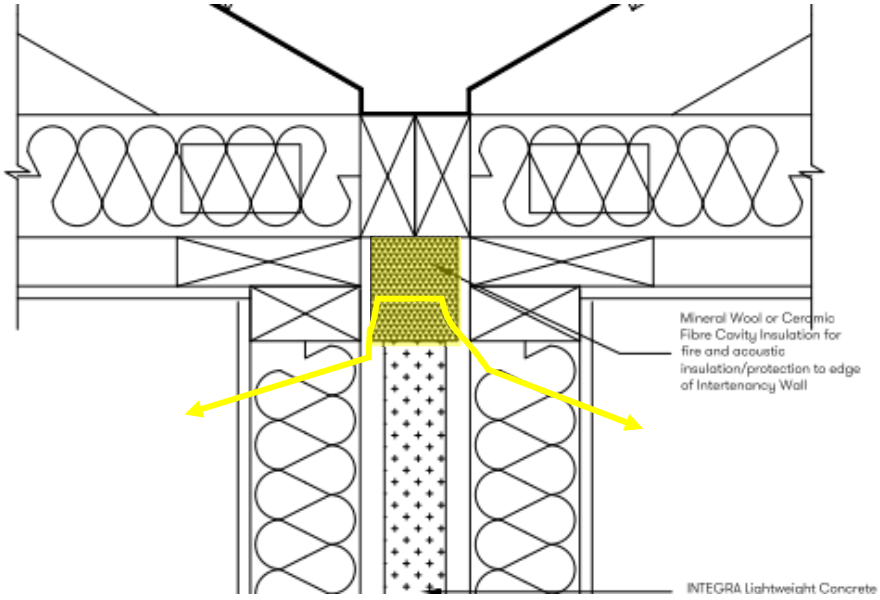

Figure 3.5 – Typical Roof Detail

Based on mineral wool ceramic fibre cavity insulation located between the Integra panel and the roofing material, continuous along the wall line (as indicated in yellow in figure 3.3 above). We expect flanking noise transmitted via the path indicated in yellow to be well controlled and the rating of the wall to be maintained.

Please do not hesitate to contact us.

Kind Regards,

Rewa Satory
BE (Mech), MASNZ
Acoustic Engineer
Acoustic Engineering Services