External & Internal Ambient Noise Assessment

Condition No.4 & 5 Discharge

37 Broadwater Road, Welwyn Garden City

On Behalf of Bishopswood Estates Limited
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Project Ref: 6889-2| Rev: 0 | Date: 6th November 2019

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Document Control Sheet

Project Name: 37 Broadwater Road, Welwyn Garden City, AL7 3AX
Project Ref: 6889
Report Title: Internal Ambient Noise Assessment
Date: 6th November 2019

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Revision	Date	Description

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1 Executive Summary

The planning consent granted for the construction of a new block of 24 flats at 37 Broadwater Road, Welwyn Garden City, by Welwyn & Hatfield Council is subject to a number of Conditions, No. 4 requiring sound level on the amenity balconies to be no more than 55 dB $L_{Aeq,T}$ by day and No. 5 requiring internal sound levels to be no more than 35 dB $L_{Aeq,T}$ in living rooms by day and 30 dB $L_{Aeq,T}$ & 45 dB $L_{Amax,regular}$ by night in bedrooms, as set out in BS8233.

This report has been commission by Bishopswood Estates Ltd and sets out measured sound levels at the front and rear of the existing office building, on the site, over a 24-hour period. Levels were highest at the front of the site, overlooking Broadwater Road, but at a level of only 63 dB $L_{Aeq,day}$ and 5 dB quieter at the rear. By night levels were 9 dB quieter than during the day.

The balconies for Plots 11, 18, 24 as well as around the roof garden will be edge protected with 1800mm high obscured glass screens, all other balconies will be 1.1m high.

These screens will provide a substantial level of attenuation. Day time external levels of no more than 47 dB $L_{Aeq,day}$ have been predicted for the roof "relax" area and no more than 53 dB on any of the balconies and therefore demonstrates compliance with Condition No. 4.

The flats will be provided with full MVHR ventilation and heat recovery systems and therefore there is no requirement through face/window trickle vents.

This report has shown that provided the windows and sliding door assemblies offer more than 32 dB R_w, as provided by Triton TBT windows, then both day and night time internal sound levels can be controlled to equal or better the internal ambient noise criteria set out in BS8233 to demonstrate compliance with Condition No. 5.

2 Planning Condition No. 5 (internal ambient noise)

Planning permission has been granted by Welwyn & Hatfield Council for the *Construction of new build of 22 x 2 Bedroom and 2 x 3 Bedroom residential apartments with balconies and a roof garden. Layout of 26 car parking spaces, cycle parking, refuse tore, internal access routes, landscaping and supporting infrastructure* at 37 Broadwater Road, Welwyn Garden City, where there is currently a redundant office building (planning reference 6/2018/2387/MAJ).

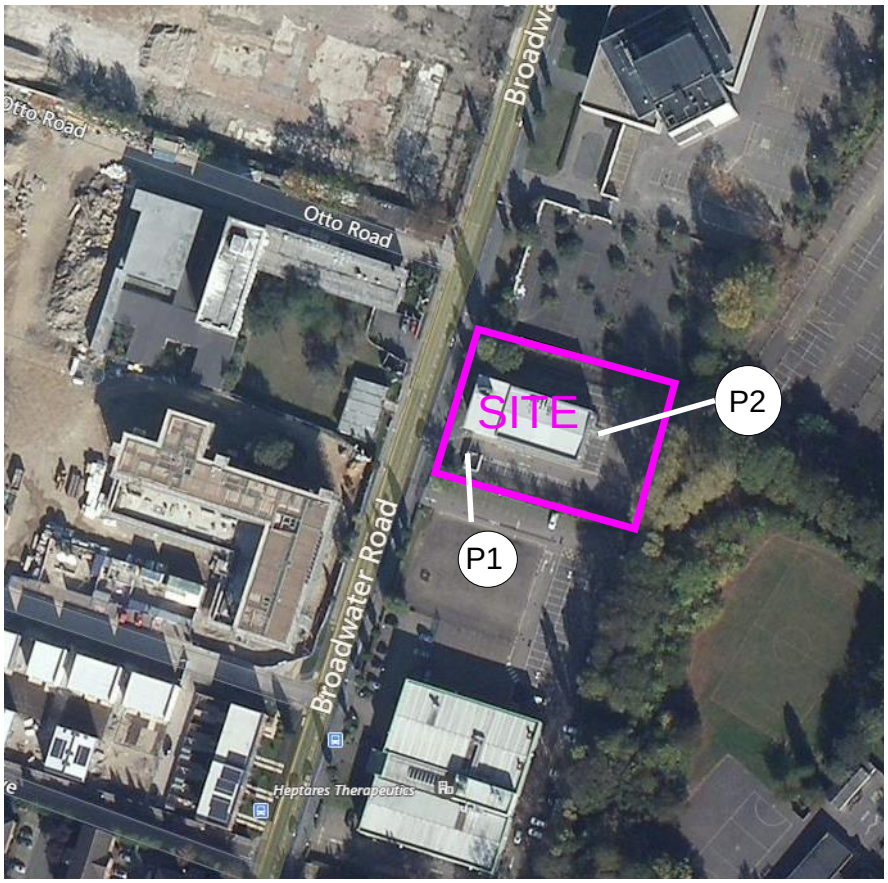
The consent is subject to a number of Conditions, two of which refer to noise, namely;

> *Condition 4 - No development above ground level in any phase of the development shall take place until the glazed balustrade/screen details have been submitted. The details should demonstrate that the necessary noise levels for the external amenity areas are in compliance with the noise requirements under BS8233:2014 and the resultant noise levels within the external amenity areas (balconies and roof top communal area) would not exceed the $L_{Aeq,T}$ 55dB. Once these details have been agreed they shall be implemented in accordance with these details and shall be in place before the first occupation of the flats and shall be retained in that form thereafter.*

Condition 5 - Prior to any above ground development the applicant shall submit to, for approval by the Local Planning Authority an environmental Noise assessment. This report should include details of a noise monitoring exercise and details of the facade and internal noise levels for the premises. Noise measurement results in terms of day and night-time L_{Aeq}, L_{Aeq}'s and for night-time, $L_{Amax\ (f)}$ will be required. Details of how the internal noise standards within BS8233 will be achieved must be provided. If opening windows compromises these levels, mechanical ventilation will be required that meets the ventilation rates within the Noise Insulation Regulations 1975 (amended 1988). Details of any mechanical ventilation systems needed to achieve this will be required.

3 Environmental Sound Levels

The aerial view below shows the site and its proximity to Broadwater Road to the front which has a 30 mph speed limit;



A site sound survey was carried out from Monday 29th to Tuesday 30th January 2018. The site was vacant and had a solid 2.4m high fence running along the pavement. At the time of setting up and collecting the two sound level meters (location shown as P1 and P2 above) the soundscape was made up of the sound of traffic moving on Broadwater Road and some demolition activity sound from the large former Weetabix factory to the north.

The photograph below shows the microphone at the front of the site (P1) at a height of approximately 3.5m from where there was a direct line of sight over the solid site hoarding on top the road;

A second meter was located at the rear of the former office building on the first floor fire exit, at a height of approximately 5m, as shown in the photograph below;

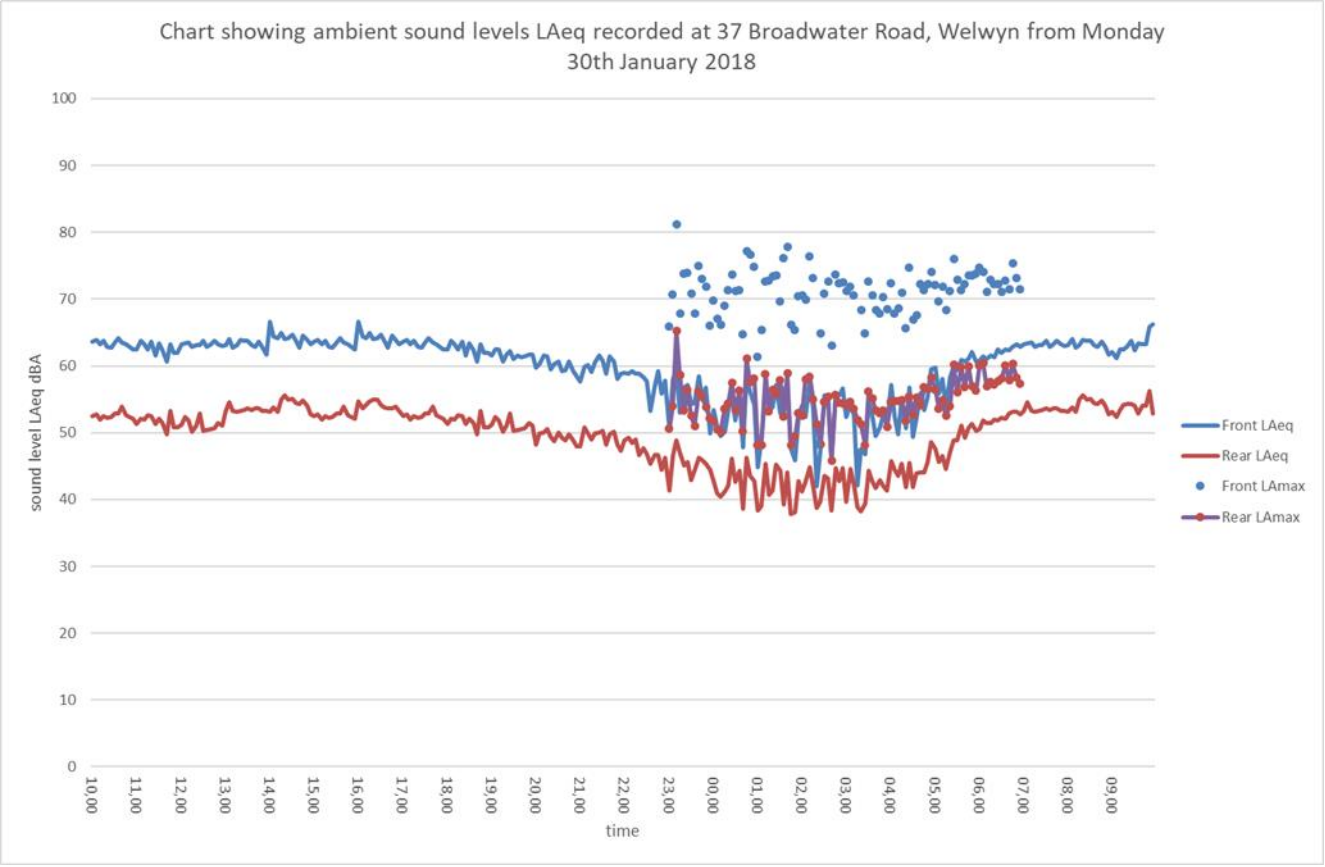
Each meter was calibrated before and after the survey without any adverse variants being observed. Details of the equipment used are given in the table below;

Make	Model	Serial No.	Calibration No.	Cert	Re-calibration due
Rion	NL31	00583286	1603119		2-3-18
Rion	NL31	012730381	1603115		15-2-18
Rion	NC74	34794316	TRAC17/04089		5-5-18

Both meters were set to record noise parameters over repetitive 5 minute periods.

The weather during the survey was clear and fine with little wind and suitable for repeatable environmental sound measurement[1].

The chart below shows the L_{Aeq} levels recorded;



[1]https://www.wunderground.com/history/airport/EGGW/2018/1/29/DailyHistory.html?req_city=EGGW&req_state=CBF&req_statename=United+Kingdom&reqdb.zip=00000&reqdb.magic=115&reqdb.wmo=03673

This chart makes it clear that sound levels were higher on the western boundary overlooking Broadwater Road than the rear. The sound levels are summarised in the table below;

Period	Front		Back	
	LAeq,T	Lamax,reg	LAeq,T	Lamax,reg
day	63		52	
night	57	75	47	59

4 Assessment of external sound levels

The level of sound incident on the facades of the new dwellings can be estimated using Wolfe IMMI 3-D computer noise modelling software, which implements the calculation procedures set out in ISO 9613-2:1996 (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation). As well as the amendment contained within ISO/TR 17534-3:2015 (Acoustics - Software for the calculation of sound outdoors - Part 3: Recommendations for quality assured implementation of ISO 9613-2 in software according to ISO 17534-1).

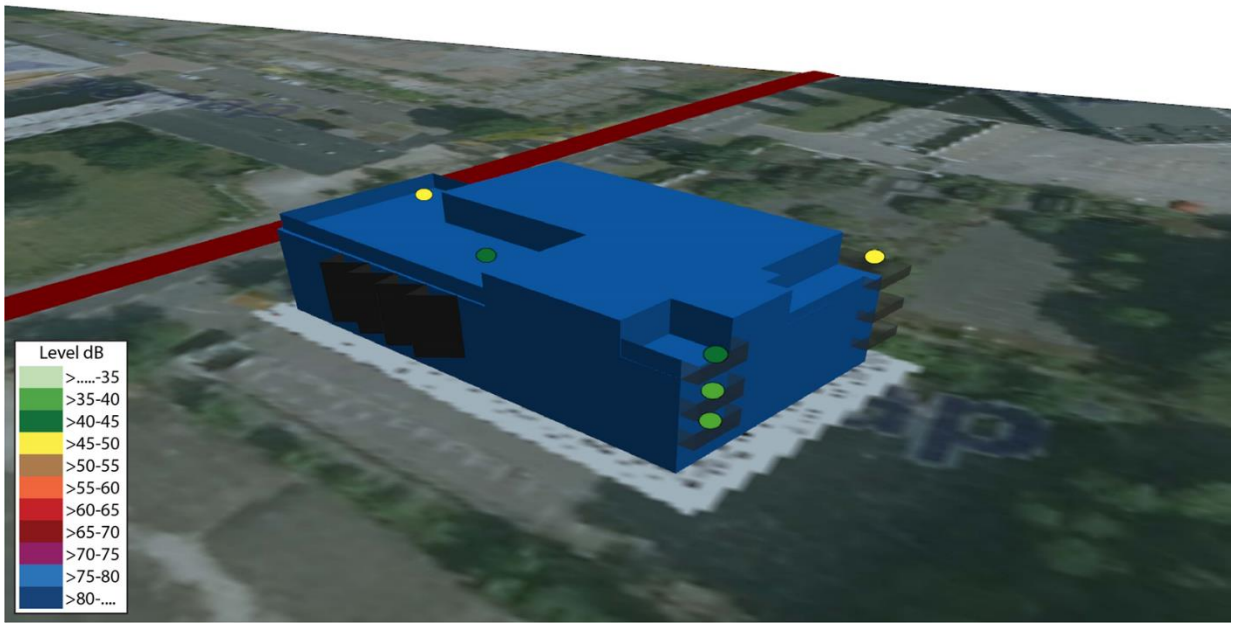
The following modelling assumptions have been relied upon;

- G = 0.0 (hard ground outside the site)
- Air temperature 10° C,
- Humidity 70%,
- Downwind propagation,
- Receiver height on external amenity/balcony areas 1.2m (seated),
- Traffic on Broadwater Road modelled as a line source 0.5m high and on centre line of carriageway,
- The general arrangement is shown on Briffa Phillips Architecture 's drawing No. 1583-200C, 201C, 202B, 307G (copies at the rear of this report),

The balconies for Plots 11, 18, 24 as well as around the roof garden will be edge protected with 1800mm high obscured glass screens, all other balconies will be 1.1m high.

4.1 Balcony sound levels

The image below shows the view of apartments looking from the south west;



The image below shows the view of the apartments from the north west;

The table over page shows the predicted day time sound level on the Relax areas on the roof and higher level balconies where sound levels from the road will be at their greatest.

Location	Day time Laeq,T dB
F11	38
F10	49
F9	51
F8	54
F18	38
F17	49
F16	51
F15	54
F24	44
F23	49
F23b	51
F22	53
Roof relax area A	47
Roof relax area B	44

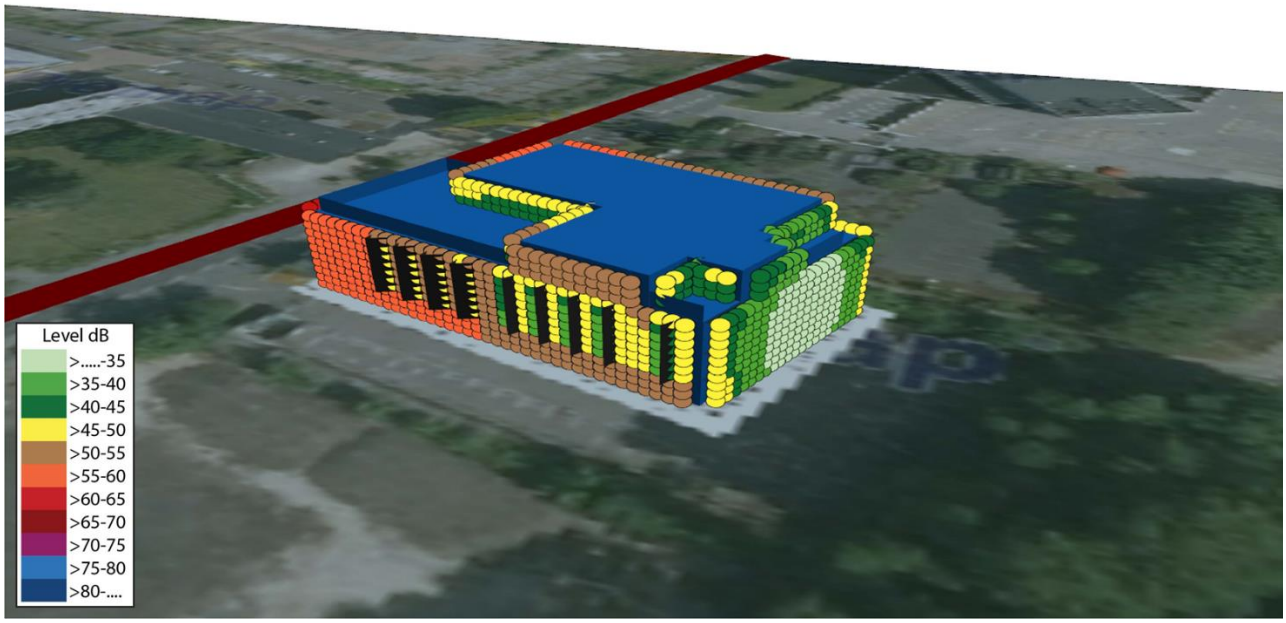
The IMMI 3D acoustic model full acoustic calculation can be shared on request.

This table shows that sound levels will be at their highest, 53 dB L_{Aeq}, on the 2nd floor balcony of Plot 22 overlooking Broadwater Road, where the glass balcony will be 1.1m high.

The predicted external amenity/balcony sound levels can therefore be seen to better the 55 dB $L_{Aeq,T}$ required by Condition No. 4 of the planning consent.

4.2 Internal ambient sound levels

The image below shows the view of apartments looking from the south west;



The image below shows the view of the apartments from the north west;

The table shows the predicted day and night time sound level outside the windows around the western end (overlooking Broadwater Road) and northern and south sides of the building, along with the internal sound criteria taken from BS4142 and the required outside to inside sound reduction performance of the façade to achieve these criteria.

Location	Façade	Day			Night					
		external Laeq,16hr	criteria	façade loss req'd	external Laeq,8hr	criteria	façade loss req'd	external Lamax,reg	criteria	façade loss req'd
7 Liv	*Front*	62	35	27						
7 Bed 2		62	35	27	53	30	23	74	45	29
7 Bed 1		62	35	27	53	30	23	74	45	29
14 Liv		62	35	27						
14 Bed 2		62	35	27	53	30	23	74	45	29
14 Bed 1		62	35	27	53	30	23	74	45	29
21 Liv		62	35	27						
21 Bed 2		62	35	27	53	30	23	74	45	29
21 Bed 1		62	35	27	53	30	23	74	45	29
6 Liv		57	35	22						
13 Liv	Sides	59	35	24	59	30	29	69	45	24
1 Liv		57	35	22	57	30	27	71	45	26
8 Liv		57	35	22	57	30	27	69	45	24
15 Liv		56	35	21	56	30	26	69	45	24
22 Liv		55	35	20	55	30	25	68	45	23
20 Liv		58	35	23	58	30	28	67	45	22

This table shows that the highest predicted day time sound level is 62 dB L_{Aeq} across the western façade of the building and to achieve an internal sound level of 35 dB $L_{Aeq,day}$ the façade (wall/window/vents) are going to have to give a combined sound reduction of 27 dBA.

For the bedrooms the lower BS8233 criteria refers to night time levels, which the survey has shown are 9 dB quieter than during the day and will be no higher than 53 L_{Aeq} outside the bedroom windows of Flat 7 and therefore require the façade to give 23 dBA sound reduction.

Although not contained directly within BS8233 it does state there is a requirement to adequately control break-in event levels (L_{Amax}). The World Health Organisation (WHO) published their guidance in 1999 for Community Noise and in this there is a recommendation to limit the noise level of events, overnight, to no more than 45 dB $L_{Aeq,regular}$[2]. The final right hand column in the table above shows that to control event noise, L_{Amax}, the façade will need to provide a higher level of 29 dBA attenuation.

Consequently, if the most onerous criteria is to limit break-in night time event noise to no more than 45 dB $L_{Amax,regular}$ and if this can be achieved by the glazing for the worst effected apartment, internal sound levels in the rest of the building will be better.

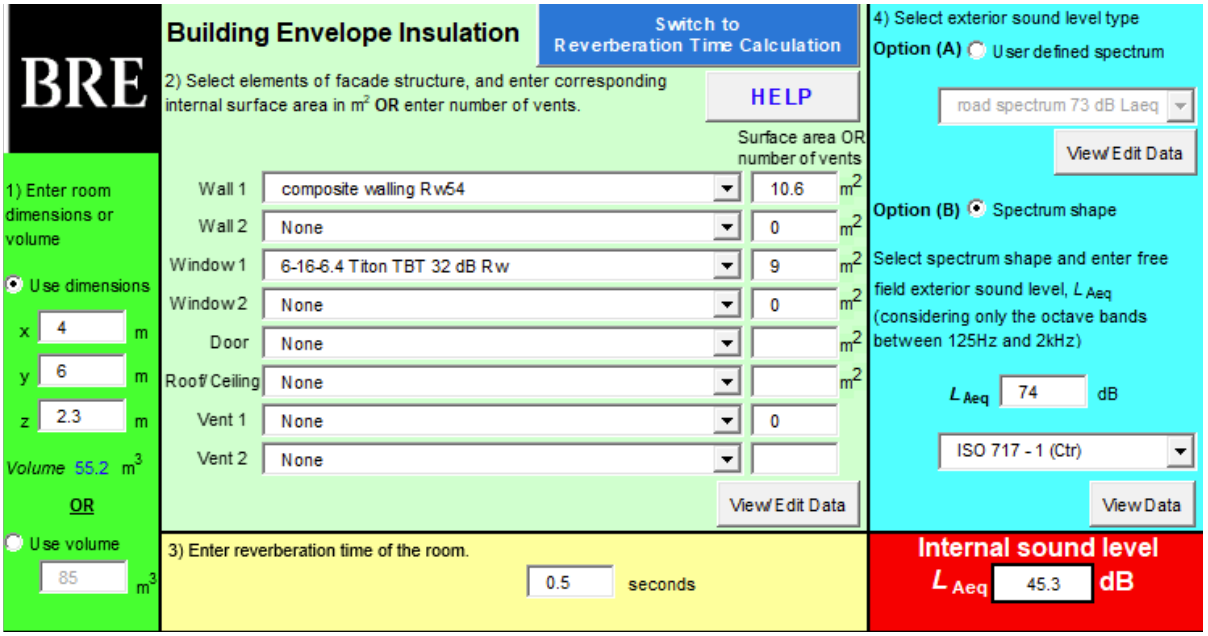
All apartments will be ventilated using MVHR[3] systems and will not be reliant on through wall/window trickle vents which could reduce the overall sound reduction of the façade.

The British Research Establishment (BRE) provided a handy calculator tool, based on the procedures laid out in BS8233, to predict the level of sound that will break-in through the composite façade.

Based on the floor layout drawings No. 1583-200C, 201C, elevations drawing No. 307G as well as the window schedule 330D to 333D and external door schedule 335G the level of sound break-in to the building can be evaluated.

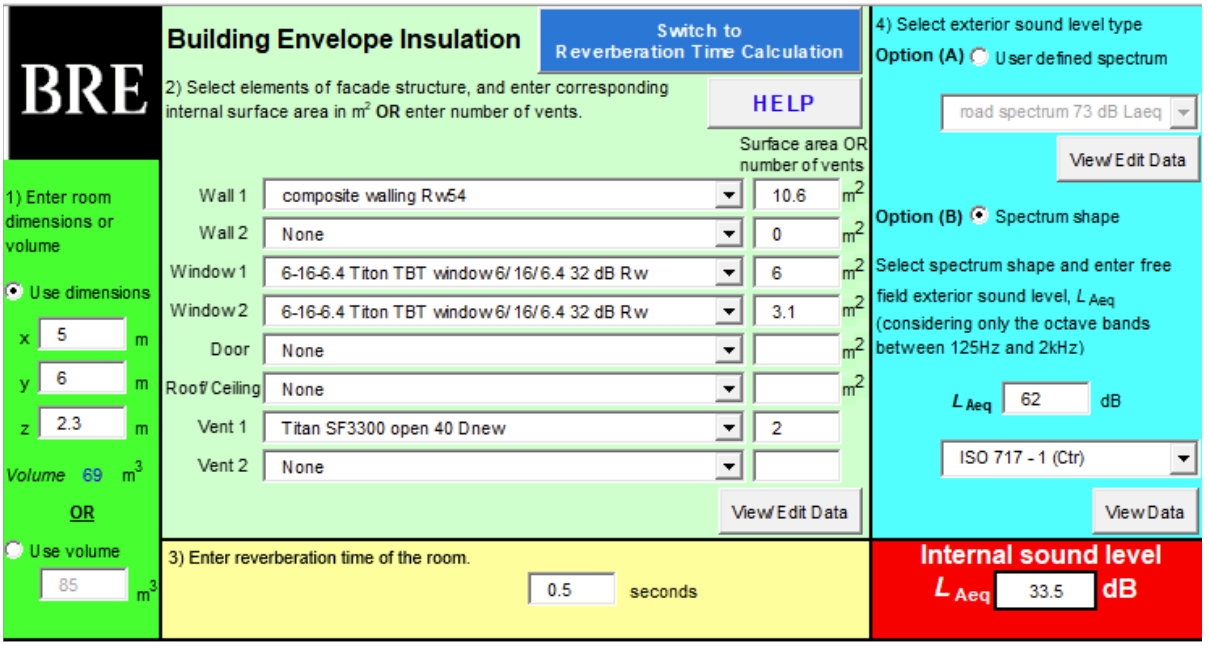
The image over page shows the prediction for Flat 7 bedroom 1, which has the highest predicted external $L_{Amax,regular}$ level of 74 dB.

[2] Regular is defined as being between 10 and 15 events over the night time period 11pm to 7am
[3] Vent-Axia Sentinel Kinetic Plus MVHR



This shows that with a Triton TBT window with double glazing configuration of 6mm glass/16mm cavity/ 6.4mm acoustic laminated glass (laboratory tests data sheet at rear of this report)[4] with a laboratory measured sound insulation performance of 32 (-1:-3) $R_w(C;C_{tr})$ dB the expected internal sound level with a 74 dB $L_{amax,regular}$ event outside will be 45 dB inside and thus equal the required criteria.

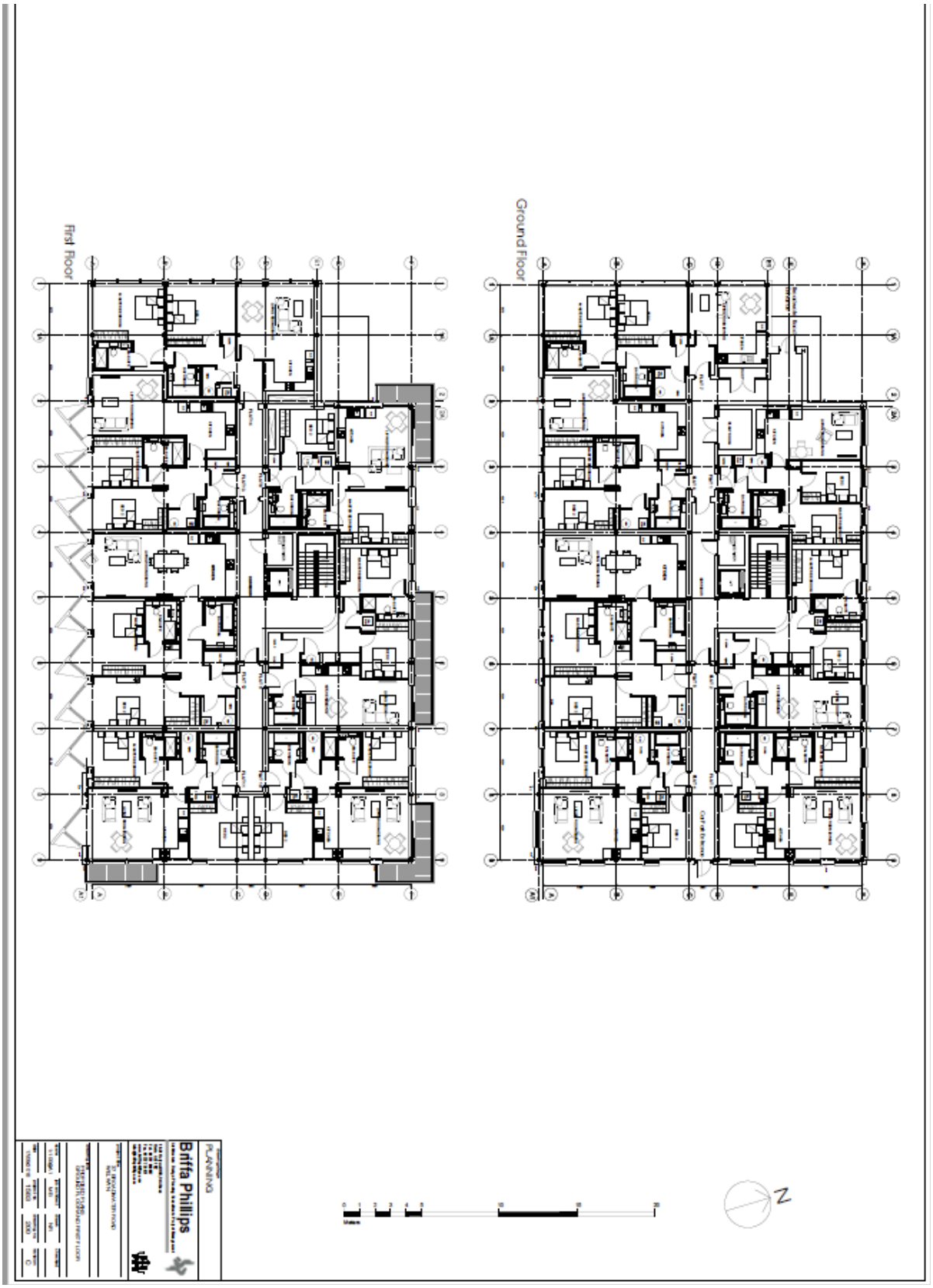
For the living room of Flat 7, which has two windows the level of day time noise breaking in is calculated as shown below to be 34 dB $L_{Aeq,16hr}$, within the 35 dB $L_{Aeq,16hr}$ criteria

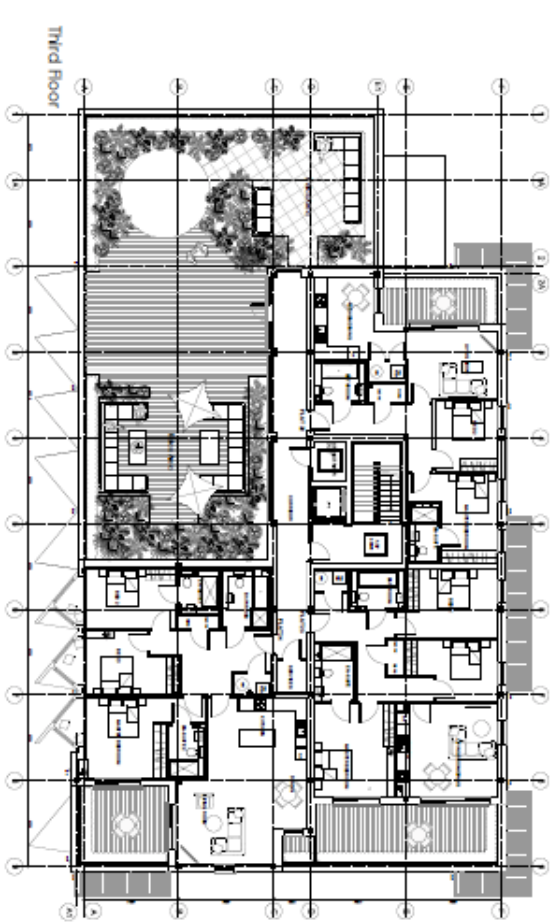


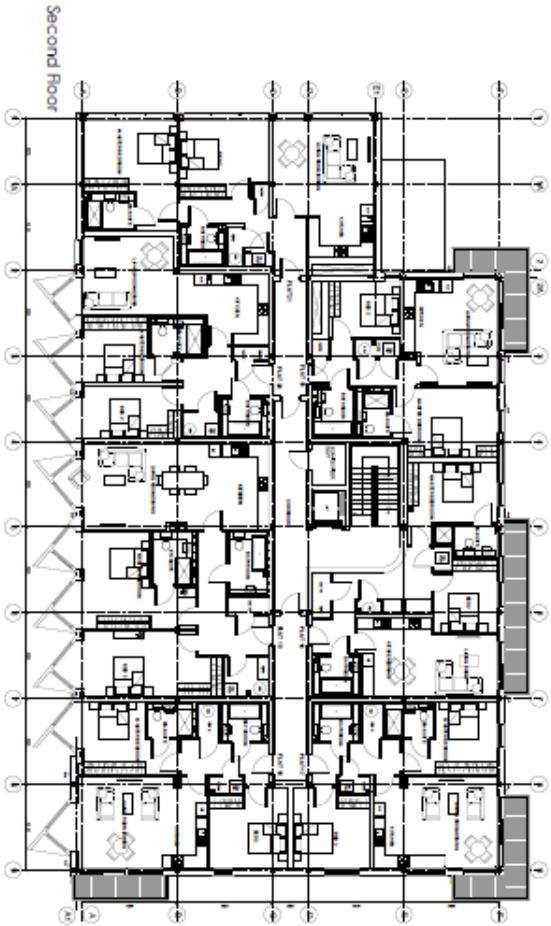
[4] SRL Technical Report ref C/21571/R01 dated 14th March 2011 Test No. 11 data sheet 8

Provided these windows are used all around the building and the sliding doors used offer equal or greater performance, then internal break-in sound levels will equal or better those required by Condition No. 5.

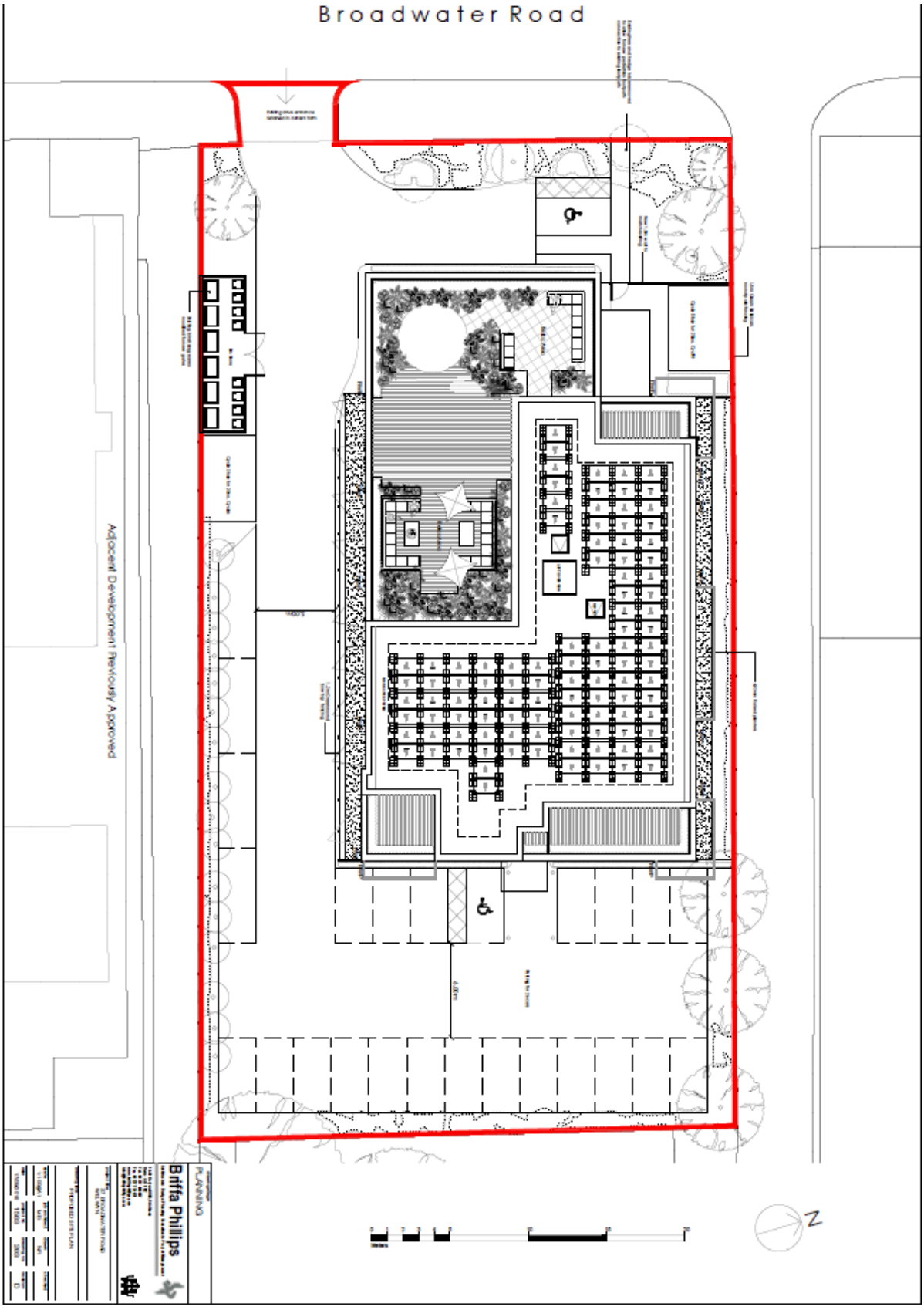
Drawing No. 1583-200C, 201C, 202B, 307G

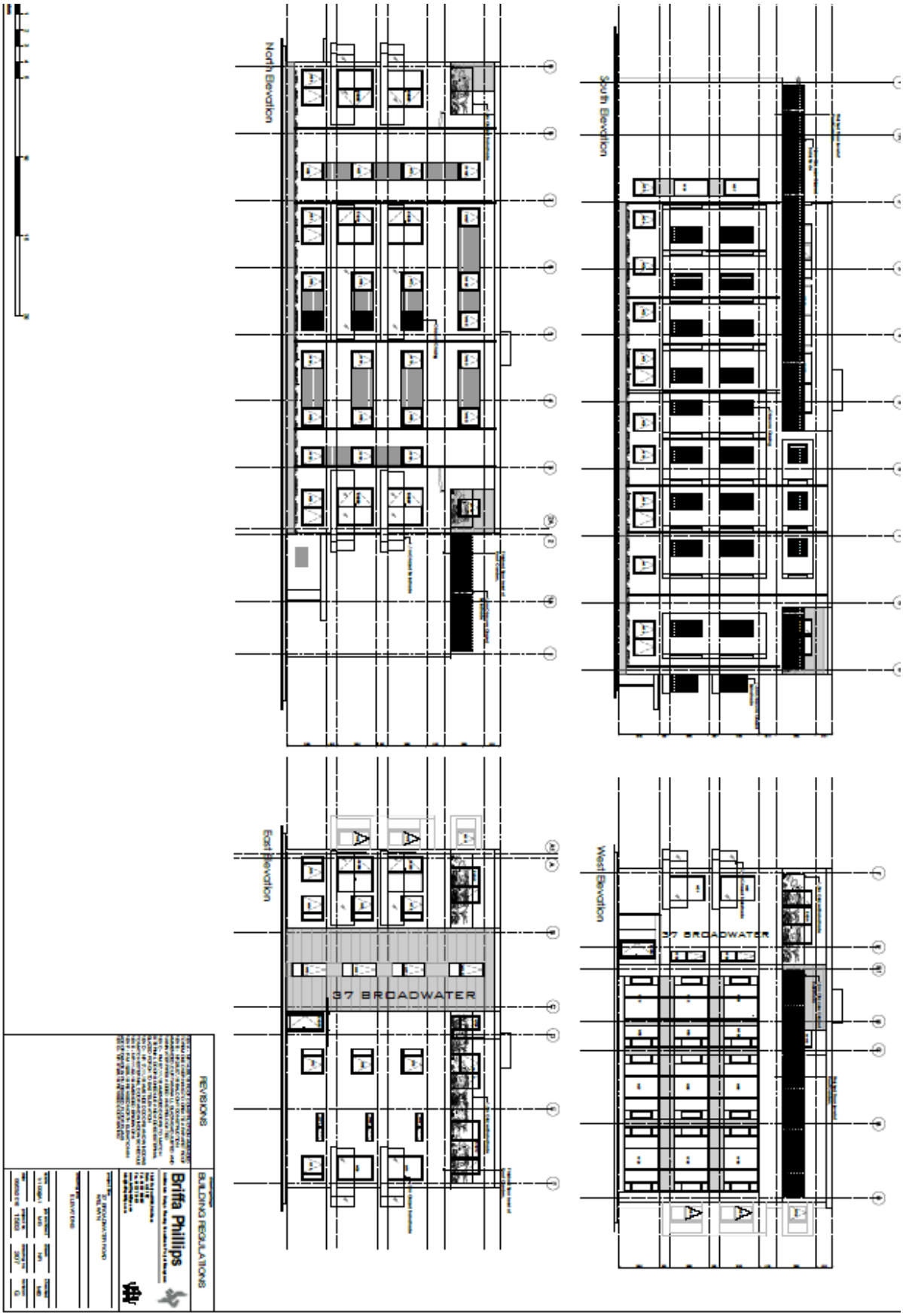



Third Floor


Second Floor


PLANNING
Briffa Phillips


Broadwater Road
Adjacent Development Previously Approved
Briffa Phillips
PLANNING


North Elevation
South Elevation
East Elevation
West Elevation
37 BROADWATER
37 BROADWATER
REVISIONS
BUILDING REGULATIONS
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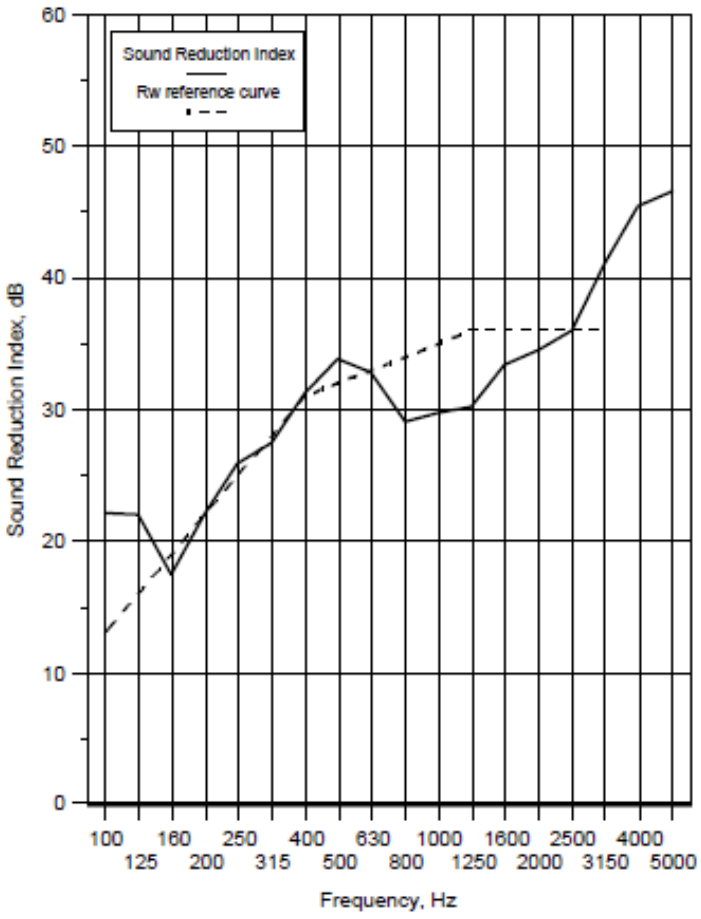
Triton TBT window sound insulation test performance

SRL

Data Sheet 8

Test Number :	11	**Air temperature:**	14 °C
Client:	Blyweert Beaufort Aluminium Ltd	**Air humidity:**	42 %
Test Date:	08/02/2011	**Receiving room volume**	300 m3
Sample height:	1.49 m	**Source room volume:**	115 m3
Sample width:	1.25 m	**Sample weight:**	35.3 kg/m2
Product Identification:	Triton TBT Window Glass - 6mm toughened / 16mm air / 6.4mm Acoustic laminate		

Freq f Hz	Sound Reduction Index, dB 1/3 Oct	1/1 Oct
50+	29.5	
63+	25.4	26.1
80+	24.8	
100	22.1	
125	22.0	20.0
160	17.5	
200	22.0	
250	25.9	24.5
315	27.5	
400	31.3	
500	33.9	32.6
630	32.9	
800	29.1	
1000	29.8	29.7
1250	30.2	
1600	33.4	
2000	34.5	34.5
2500	36.0	
3150	41.2	
4000	45.5	43.8
5000	46.6	
6300+	48.4	
8000+	49.4	49.2
10000+	50.1 *	
Average 100-3150	29.3	Version v1.7



Rating according to BS EN ISO 717-1:1997
Rw(C;Ctr)= **32 (-1;-3) dB**

* shows measurement corrected for background
\# shows limit of measurement due to background
\+ shows frequency beyond standard and not UKAS accredited