·EDINBVRGH·
THE CITY OF EDINBURGH COUNCIL

MICA Architects.
Kelly Ordemann
123 Camden High Street
London
United Kingdom
NW1 7JR

Mr Robin Hogarth.
124 Brunton Gardens
Montgomery Street
Edinburgh
EH7 5ET

Decision date: 5 February 2021

TOWN AND COUNTRY PLANNING (SCOTLAND) ACTS
DEVELOPMENT MANAGEMENT PROCEDURE (SCOTLAND) REGULATIONS 2013

Change of use from office to single open plan residential unit. Internal fit out to include kitchen and minimal internal walls.
At 104 Constitution Street Edinburgh EH6 6AW

Application No: 20/05447/FUL

DECISION NOTICE

With reference to your application for Planning Permission registered on 7 December 2020, this has been decided by **Local Delegated Decision**. The Council in exercise of its powers under the Town and Country Planning (Scotland) Acts and regulations, now determines the application as **Refused** in accordance with the particulars given in the application.

Any condition(s) attached to this consent, with reasons for imposing them, or reasons for refusal, are shown below;

Conditions:-

Reasons:-

1. It has not been demonstrated that a suitable living environment can be achieved in relation to the immediately juxtaposed bar and restaurant beneath. Residential use is unlikely to be compatible with the neighbouring use.

Stephen Dickson, Senior planning officer, Local 1 Area Team, Place Directorate.
Email stephen.dickson@edinburgh.gov.uk,
Waverley Court, 4 East Market Street, Edinburgh, EH8 8BG

Please see the guidance notes on our decision page for further information, including how to appeal or review your decision.

Drawings 1-15, represent the determined scheme. Full details of the application can be found on the Planning and Building Standards Online Services

The reason why the Council made this decision is as follows:

The proposal fails to comply with LDP policy Hou5 inasmuch that the juxtaposition to the bar/restaurant on the immediate floor below is unlikely to create a suitable residential amenity.

This determination does not carry with it any necessary consent or approval for the proposed development under other statutory enactments.

Should you have a specific enquiry regarding this decision please contact Stephen Dickson directly at stephen.dickson@edinburgh.gov.uk.

D R Leslie

Chief Planning Officer
PLACE
The City of Edinburgh Council

NOTES

1. If the applicant is aggrieved by the decision to refuse permission for or approval required by a condition in respect of the proposed development, or to grant permission or approval subject to conditions, the applicant may require the planning authority to review the case under section 43A of the Town and Country Planning (Scotland) Act 1997 within three months beginning with the date of this notice. The Notice of Review can be made online at www.eplanning.scot or forms can be downloaded from that website. Paper forms should be addressed to the City of Edinburgh Planning Local Review Body, G.2, Waverley Court, 4 East Market Street, Edinburgh, EH8 8BG. For enquiries about the Local Review Body, please email localreviewbody@edinburgh.gov.uk.

2. If permission to develop land is refused or granted subject to conditions and the owner of the land claims that the land has become incapable of reasonably beneficial use in its existing state and cannot be rendered capable of reasonably beneficial use by carrying out of any development which has been or would be permitted, the owner of the land may serve on the planning authority a purchase notice requiring the purchase of the owner of the land's interest in the land accordance with Part 5 of the Town and Country Planning (Scotland) Act 1997.

Report of Handling

Application for Planning Permission
104 Constitution Street, Edinburgh, EH6 6AW

Proposal: Change of use from office to single open plan residential unit. Internal fit out to include kitchen and minimal internal walls.

Item – Local Delegated Decision
Application Number – 20/05447/FUL
Ward – B13 - Leith

Recommendation

It is recommended that this application be **Refused** subject to the details below.

Summary

The proposal fails to comply with LDP policy Hou5 inasmuch that the juxtaposition to the bar/restaurant on the immediate floor below is unlikely to create a suitable residential amenity.

SECTION A – Application Background

Site Description

The property is a first floor office contained within a mansard roof over ground floor commercial uses (a bar/restaurant to south plus two small and linked retail units to north). It has dual access: both to the street and from the rear courtyard. The building appears as two storey with a flat roof when viewed from the rear. The building dates from 1887 and was restored in the 1980s. It was listed category B on 29.4.1977 ref.27351.

The property backs onto a narrow courtyard which has limited vehicle access via a central, gated pend. This rear area lies outwith the application site, but there is a secondary access to the application property in a concealed corner at the north end of the courtyard. A stair goes over a commercial bin area to access the property.

The property lies in the Leith Conservation Area. The surrounding area is of mixed uses. The immediately adjacent road surface is currently closed for the construction of the Edinburgh Tram.

Description Of The Proposal

The application proposes change of use from office to residential. External alterations are minimal and would not require planning permission in their own right.

Relevant Site History
No relevant site history.

Consultation Engagement

Environmental Protection

Publicity and Public Engagement

Date of Neighbour Notification: 14 December 2020
Date of Advertisement: 31 December 2020
Date of Site Notice: 18 December 2020
Number of Contributors: 0

Section B - Assessment

Determining Issues

Section 25 of the Town and Country Planning (Scotland) Act 1997 states - Where, in making any determination under the Planning Acts, regard is to be had to the development plan, the determination shall be made in accordance with the plan unless material considerations indicate otherwise.

Section 59 of the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 states that in considering whether to grant planning permission for development which affects a listed building or its setting, a planning authority shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.

Section 64 of the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 states - special attention shall be paid to the desirability of preserving or enhancing the character or appearance of the conservation area.

Do the proposals comply with the development plan?

If the proposals do comply with the development plan, are there any compelling reasons for not approving them?

If the proposals do not comply with the development plan, are there any compelling reasons for approving them?

Assessment

To address these determining issues, it needs to be considered whether:

a) the principle of the proposal is acceptable in this location;

b) the proposed scale, design and materials are acceptable;

c) the proposal will result in an unreasonable loss of neighbouring amenity;

d) the proposal affects road safety;

e) any impacts on equalities and human rights are acceptable; and

f) any comments have been addressed.

a) Principle of Development

LDP policy Hou5 considers conversions to residential use.

There is no policy protection for the outgoing office use. For the proposed residential use policy Hou5 has four requirements to be met:

- A satisfactory residential environment can be achieved
- Housing would be compatible with nearby uses
- Appropriate open space, amenity and car and cycle parking standards are met
- The change of use is acceptable in relation to other policies.

The primary issue within the proposal is its location immediately above a bar/restaurant. Whilst an NIA was submitted with the application, this was undertaken during the ongoing closure of the bar/restaurant and so is incomplete. It would also appear to include errors in relation to presumed ventilation (stating that restaurant ventilation ends 8.6m above the flat roof which is not the case). The NIA fails to satisfactorily demonstrate that a residential use will be compatible with the underlying bar/restaurant. For this reason the application is refused.

It is noted that the proposed property would receive most of its visual amenity from the windows facing the rear courtyard. The courtyard is very enclosed and serves as the sole access to the three-storey building to the rear. The usage of the rear courtyard is unclear, but the courtyard is of very limited value in terms of visual amenity. It is noted that were anyone to gather within the rear courtyard this would further impact on the amenity of the proposed unit.

Plant noise from the bar/restaurant has not been assessed and cannot be assessed until the restaurant reopens.

It is also noted that there is no assessment of potential tram noise in the NIA, despite the site being in close proximity to the tram line (around 6m to east).

The proposal has no open space but lies around 200m from Leith Links, which would provide good quality amenity space. Lack of parking is acceptable and accords with current guidelines.

In overall summary, the application has not demonstrated the compatibility of the use with adjacent uses. Adequate amenity is not evidenced and the proposal is refused as being contrary to Hou5.

b) Scale, design and materials

The physical alterations have no material impact on the character and appearance of the conservation area and no impact on the character of the listed building.

c) Neighbouring Amenity

The proposal itself would have no impact upon neighbouring amenity.

d) Traffic and Car parking

The property has no parking connected. It stands adjacent to the proposed tram line (currently under construction) and would be adequately served by public transport.

e) Equalities and human rights

The proposal has no impact on equalities or human rights.

f) Public comment

No comments have been received.

Section C - Conditions/Reasons/Informatives

The recommendation is subject to the following;

Conditions

Reasons

1. It has not been demonstrated that a suitable living environment can be achieved in relation to the immediately juxtaposed bar and restaurant beneath. Residential use is unlikely to be compatible with the neighbouring use.

Background Reading/External References

To view details of the application go to the Planning Portal

Further Information - Local Development Plan

Date Registered: 7 December 2020

Drawing Numbers/Scheme

1-15

Scheme 1

David R. Leslie
Chief Planning Officer
PLACE
The City of Edinburgh Council

Contact: Stephen Dickson, Senior planning officer
E-mail:stephen.dickson@edinburgh.gov.uk

Appendix 1

Consultations

NAME: Environmental Protection
COMMENT: Great concerns raised regarding the juxtaposition to the bar/restaurant on the level below, in relation to both direct and indirect noise from both custom and plant and also in relation to potential odours. Whilst an NIA was submitted this makes several unsupported claims and is not sufficient to safeky grant a consent. As the bar/restaurant is closed no accurate NIA can be carried out.

THE CITY OF EDINBURGH COUNCIL

Business Centre G.2 Waverley Court 4 East Market Street Edinburgh EH8 8BG Email: planning.support@edinburgh.gov.uk

Applications cannot be validated until all the necessary documentation has been submitted and the required fee has been paid.

Thank you for completing this application form:

ONLINE REFERENCE 100404973-001

The online reference is the unique reference for your online form only. The Planning Authority will allocate an Application Number when your form is validated. Please quote this reference if you need to contact the planning Authority about this application.

Applicant or Agent Details

Are you an applicant or an agent? * (An agent is an architect, consultant or someone else acting on behalf of the applicant in connection with this application) ☐ Applicant ☒ Agent

Agent Details

Please enter Agent details

Company/Organisation:	Scott Hobbs Planning		
Ref. Number:		You must enter a Building Name or Number, or both: *	
First Name: *	Rhiannon	Building Name:	24a
Last Name: *	Martin	Building Number:	
Telephone Number: *	01312267225	Address 1 (Street): *	Stafford Street
Extension Number:		Address 2:	
Mobile Number:		Town/City: *	Edinburgh
Fax Number:		Country: *	United Kingdom
		Postcode: *	EH3 7BD
Email Address: *	rm@scotthobbsplanning.com		

Is the applicant an individual or an organisation/corporate entity? *

☒ Individual ☐ Organisation/Corporate entity

Applicant Details

Please enter Applicant details

Title:	Mr	You must enter a Building Name or Number, or both: *	
Other Title:		Building Name:	
First Name: *	Robin	Building Number:	124
Last Name: *	Hogarth	Address 1 (Street): *	Brunton Gardens
Company/Organisation		Address 2:	Montgomery Street
Telephone Number: *		Town/City: *	Edinburgh
Extension Number:		Country: *	United Kingdom
Mobile Number:		Postcode: *	EH7 5ET
Fax Number:			
Email Address: *	[redacted]		

Site Address Details

Planning Authority:	City of Edinburgh Council

Full postal address of the site (including postcode where available):

Address 1:	104 CONSTITUTION STREET
Address 2:	
Address 3:	
Address 4:	
Address 5:	
Town/City/Settlement:	EDINBURGH
Post Code:	EH6 6AW

Please identify/describe the location of the site or sites

Northing	676190	Easting	327171

Description of Proposal

Please provide a description of your proposal to which your review relates. The description should be the same as given in the application form, or as amended with the agreement of the planning authority: *
(Max 500 characters)

Change of use from office to single open plan residential unit. Internal fit out to include kitchen and minimal internal walls.

Type of Application

What type of application did you submit to the planning authority? *

☒ Application for planning permission (including householder application but excluding application to work minerals).

☐ Application for planning permission in principle.

☐ Further application.

☐ Application for approval of matters specified in conditions.

What does your review relate to? *

☒ Refusal Notice.

☐ Grant of permission with Conditions imposed.

☐ No decision reached within the prescribed period (two months after validation date or any agreed extension) – deemed refusal.

Statement of reasons for seeking review

You must state in full, why you are a seeking a review of the planning authority's decision (or failure to make a decision). Your statement must set out all matters you consider require to be taken into account in determining your review. If necessary this can be provided as a separate document in the 'Supporting Documents' section: * (Max 500 characters)

Note: you are unlikely to have a further opportunity to add to your statement of appeal at a later date, so it is essential that you produce all of the information you want the decision-maker to take into account.

You should not however raise any new matter which was not before the planning authority at the time it decided your application (or at the time expiry of the period of determination), unless you can demonstrate that the new matter could not have been raised before that time or that it not being raised before that time is a consequence of exceptional circumstances.

Please see attached Local Review Statement.

Have you raised any matters which were not before the appointed officer at the time the Determination on your application was made? * ☒ Yes ☐ No

If yes, you should explain in the box below, why you are raising the new matter, why it was not raised with the appointed officer before your application was determined and why you consider it should be considered in your review: * (Max 500 characters)

Please see attached Local Review Statement.

Please provide a list of all supporting documents, materials and evidence which you wish to submit with your notice of review and intend to rely on in support of your review. You can attach these documents electronically later in the process: * (Max 500 characters)

Please see attached Local Review Documents List.

Application Details

Please provide the application reference no. given to you by your planning authority for your previous application. 20/05447/FUL

What date was the application submitted to the planning authority? * 04/12/2020

What date was the decision issued by the planning authority? * 05/02/2021

Review Procedure

The Local Review Body will decide on the procedure to be used to determine your review and may at any time during the review process require that further information or representations be made to enable them to determine the review. Further information may be required by one or a combination of procedures, such as: written submissions; the holding of one or more hearing sessions and/or inspecting the land which is the subject of the review case.

Can this review continue to a conclusion, in your opinion, based on a review of the relevant information provided by yourself and other parties only, without any further procedures? For example, written submission, hearing session, site inspection. *

☒ Yes ☐ No

In the event that the Local Review Body appointed to consider your application decides to inspect the site, in your opinion:

Can the site be clearly seen from a road or public land? * ☒ Yes ☐ No

Is it possible for the site to be accessed safely and without barriers to entry? * ☐ Yes ☒ No

Checklist – Application for Notice of Review

Please complete the following checklist to make sure you have provided all the necessary information in support of your appeal. Failure to submit all this information may result in your appeal being deemed invalid.

Have you provided the name and address of the applicant?. * ☒ Yes ☐ No

Have you provided the date and reference number of the application which is the subject of this review? * ☒ Yes ☐ No

If you are the agent, acting on behalf of the applicant, have you provided details of your name and address and indicated whether any notice or correspondence required in connection with the review should be sent to you or the applicant? * ☒ Yes ☐ No ☐ N/A

Have you provided a statement setting out your reasons for requiring a review and by what procedure (or combination of procedures) you wish the review to be conducted? * ☒ Yes ☐ No

Note: You must state, in full, why you are seeking a review on your application. Your statement must set out all matters you consider require to be taken into account in determining your review. You may not have a further opportunity to add to your statement of review at a later date. It is therefore essential that you submit with your notice of review, all necessary information and evidence that you rely on and wish the Local Review Body to consider as part of your review.

Please attach a copy of all documents, material and evidence which you intend to rely on (e.g. plans and Drawings) which are now the subject of this review * ☒ Yes ☐ No

Note: Where the review relates to a further application e.g. renewal of planning permission or modification, variation or removal of a planning condition or where it relates to an application for approval of matters specified in conditions, it is advisable to provide the application reference number, approved plans and decision notice (if any) from the earlier consent.

Declare – Notice of Review

I/We the applicant/agent certify that this is an application for review on the grounds stated.

Declaration Name: Miss Rhiannon Martin

Declaration Date: 30/04/2021

Proposal Details

Proposal Name	100404973
Proposal Description	Change of use.
Address	104 CONSTITUTION STREET, EDINBURGH,
EH6	6AW
Local Authority	City of Edinburgh Council
Application Online Reference	100404973-001

Application Status

Form	complete
Main Details	complete
Checklist	complete
Declaration	complete
Supporting Documentation	complete
Email Notification	complete

Attachment Details

Notice of Review	System	A4
Document 2 Design Statement - submitted via email due to file size	Posted	A3
Document 3 Email to Alan Moonie	Attached	A4
Document 4 Noise Impact Assessment Revision 10 submitted via email due to file size	Posted	A4
Document 5 251 19200 PL2 drawing mark up 26042021 revision PL2	Attached	A3
Document 6 251 19210 PL2 drawing mark up 26042021 revision PL2	Attached	A3
Document 7 251 19220 PL2 drawing mark up 26042021 revision PL2	Attached	A3
Document 8 251 41000 PL1 Existing Wall and Floor Section	Attached	A3
Document 9 251 41001 PL1 Proposed Wall and Floor Section	Attached	A3
Document 1 Local Review Statement	Attached	A4
Local Review Documents List	Attached	A4
Notice_of_Review-2.pdf	Attached	A0
Application_Summary.pdf	Attached	A0
Notice of Review-001.xml	Attached	A0

0131 226 7225
info@scotthobbsplanning.com
www.scotthobbsplanning.com

24a Stafford Street
Edinburgh
EH3 7BD

30 April 2021

Local Review Statement

20/05447/FUL Notice of Review

104 Constitution Street, Edinburgh

Introduction

1. This Summary Statement is prepared on behalf of Mr Robin Hogarth ('the Applicant') and relates to a Notice of Review for planning application reference 20/05447/FUL ('the Application'), which was refused by City of Edinburgh Council ('CEC') on 5 February 2021. The Application Site is located at 104 Constitution Street, Edinburgh and is owned by the Applicant. The description of development for the Application is as follows:

   '*Change of use from office to single open plan residential unit. Internal fit out to include kitchen and minimal internal walls.*'

2. The refusal was issued whilst the Applicant was in the process of addressing the concerns raised by Environmental Protection ('EP') in their response to the Application, and prior to this process being finalised. Further details of the timeline of events are provided in Appendix 1. All the issues raised by the case officer and EP have been thoroughly addressed by the Local Review submission. The Applicant has confirmed with Alan Moonie by phone call and subsequent email dated 23 February 2021 that the additional information provided can be submitted with the Local Review. This email is enclosed as Document 3.

3. The Report of Handling and Decision Notice for the Application contends that the proposed residential unit will not have a sufficient standard of amenity, contrary to Policy Hou 5 of the Edinburgh Local Development Plan ('LDP'). This Notice of Review considers that an appropriate standard of amenity will be provided, as demonstrated by the updated NIA (Document 4) and closed window attenuation and floor insulation illustrated on the plans enclosed as Documents 5 - 9. Further details are provided below.

Consultation

4. There were no public representations submitted during the course of the Application. Post-decision, Councillor Gordon Monroe was consulted and fully supports the proposals, noting that the use is in accordance with economic development policy, which designates this part of Edinburgh its cultural quarter.

Noise Impacts

5. It is considered that the delegated decision to refuse was not a reasonable action and following receipt of the refusal, the Applicant continued its ongoing email correspondence with EP directly. At the request of EP, additional assessments have been provided within the NIA (Document 5) of potential noise sources, including the small, upmarket restaurant below, the nearby shop, and the proposed tram line in the vicinity.

6. Acoustic insulation is now proposed within the floor to address the comments from EP, and this is illustrated on Documents 8 and 9. In addition, closed window attenuation is proposed at the window closest to the restaurant kitchen on the rear elevation, as illustrated on Documents 5 to 7. The following enforceable condition on the planning permission is suggested:

*'The apartment hereby approved shall not be occupied unless the highlighted window is sealed in accordance with the details shown on plan reference '251-MICA-PL-00-DR-A-19220', **mark up date 26/04/2021, revision PL2; and in accordance with the information detailed in the Airshed report reference** 'AS 0792 Constitution Street' dated 26/04/2021; or as otherwise approved by the local planning authority.'*

7. This condition is enforceable, so if in future the window is opened and occupants complain about noise, the occupant will be in breach of the condition, CEC can require it to be resealed and as such, the restaurant use will not be adversely impacted.

8. Closed window attenuation and associated conditions are a solution to potential noise issues which has been accepted by CEC at many other sites across Edinburgh and it is considered this is the appropriate way forward in this instance.

Assessment

9. The Decision Notice states that the proposal is contrary to Policy Hou 5. Table 1 below provides a summary of the Policy requirements, extracts from the CEC Handling Report and an updated assessment which takes into account the liaison with EP, plans and information updates and the suggested condition referred to above.

Hou 5 Requirement	Handling Report Extract	Updated Assessment
A satisfactory residential environment can be achieved.	*'Adequate amenity is not evidenced…'*	Adequate amenity and compatibility with the surrounding uses is demonstrated in the NIA and AQA. The suggested enforceable condition will ensure no adverse impacts on the restaurant use in future due to potential noise impacts.
Housing would be compatible with nearby uses.	*'The NIA fails to satisfactorily demonstrate that a residential use will be compatible with the underlying bar/restaurant. For this reason the application is refused.'*	
Appropriate open space, amenity and car and cycle parking standards are met	*'The proposal has no open space but lies around 200m from Leith Links, which would provide good quality amenity space. Lack of parking is acceptable and accords with current guidelines.'*	No change, the proposal complies with Policy Hou 5.
The change of use is acceptable in relation to other policies.	*'There is no policy protection for the outgoing office use.'*	No change, the proposal complies with Policy Hou 5.

Conclusion

11. It is clear that the proposed change of use was refused only on grounds of noise. It is also clear from the information submitted with this review that those concerns can be addressed. Policy Hou 5 requires a satisfactory residential environment – that amenity is provided by many factors, including the location of the apartment, the accessibility of services and facilities, the type and size of accommodation required. Noise is just one element that has to be balanced.

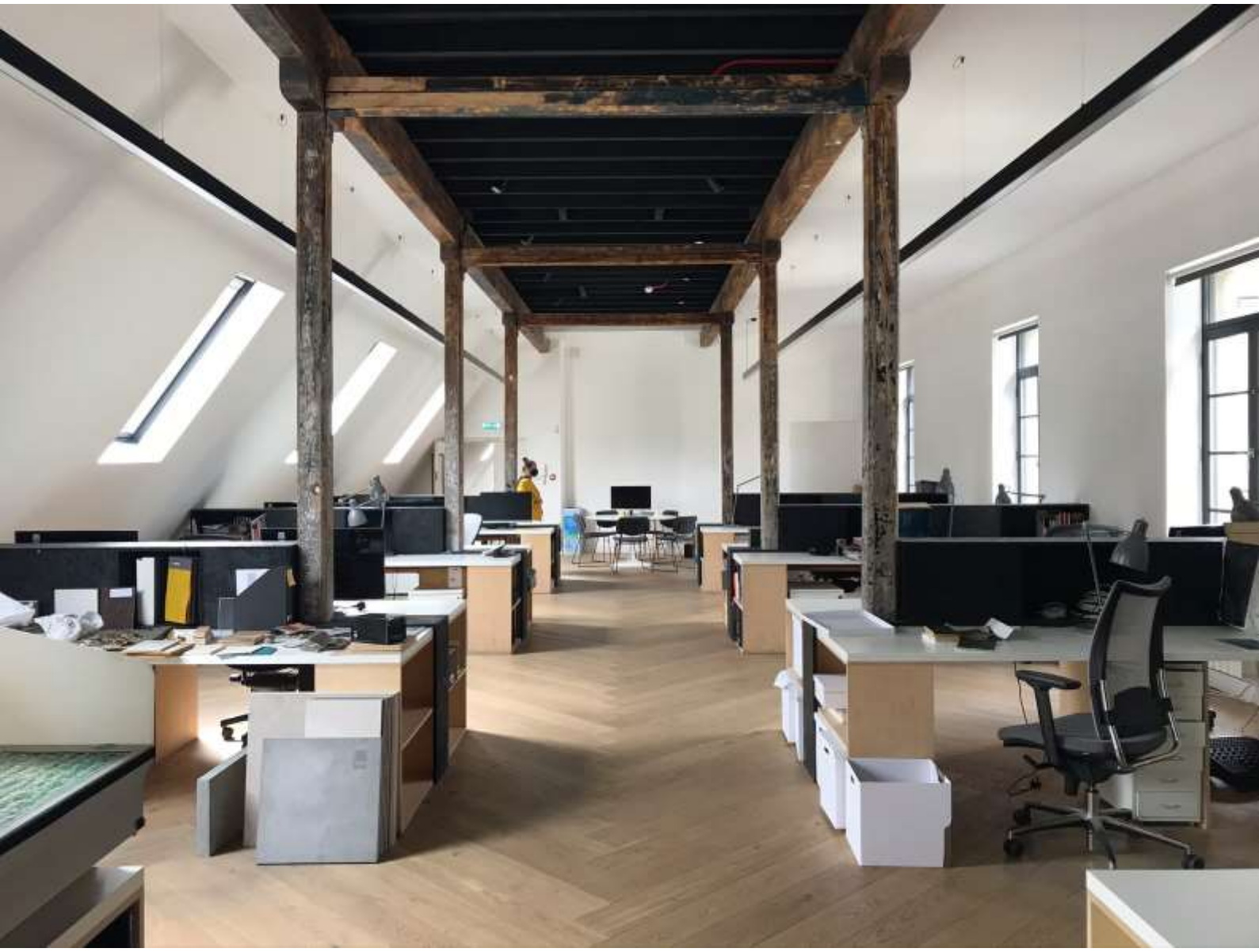
12. There are many residential properties above commercial properties in the town and local centres in Edinburgh – it is a unique characteristic of the city and it is clear that a location such as Constitution Street will not be as quiet as a more suburban location. The Applicant has specifically chosen this site and, accordingly, is willing to occupy under the known conditions of the site and its location.

13. The Applicant has proposed the condition, in accordance with the advice in the NIA, which addressed the EP concerns regarding noise attenuation. Considering the above, planning permission should be granted for the proposed development as the proposal is wholly in accordance with Policy Hou 5 and there are no material considerations to indicate otherwise.

Appendix 1 – Timeline of Events

The following information provides background on the timeline of events and how the Application was handled by CEC:

- **13 October 2020** – pre-application advice letter received, noting that residential use may be acceptable subject to other policies. Highlights specific concerns regarding noise and air quality, stating the application will need to demonstrate acceptable levels of residential amenity.
- **4 December 2020** – planning application submitted with the NIA and AQA which conclude there will be an acceptable impact to future occupants, with the proposals providing a slightly better environment than existing to noise sensitive receptors.
- **15 December 2021** – EP email the Application case officer their comments on the application and the methodology / outcomes of the NIA.
- **29 January 2021** – the above correspondence is published the public access portal and at that time the Applicant becomes aware of the EP comments.
- **3 February 2021** – the Applicant responds to EP, explaining the proposed alternative methodology and that an extension of time is required to allow the information to be gathered / reported. Attaches a detailed response provided by Airshed.
- **3 February 2021** – the Applicant requests and extension of time by 2-3 weeks to allow the additional information to be gathered. The case officer ignores this request, noting overall the principle of residential over a bar is generally resisted.
- **4 February 2021** – EP provide a response to the Applicant and Airshed with further queries.
- **4 February 2021** – the Applicant responds, answering queries and stating the Applicant will follow his guidance and aim to provide an updated report to the satisfaction of EP, with clear documentation on how and what noise levels are included. Notes that drawings / photographs will be forwarded with the revised report for EP's information.
- **4 February 2021** – EP thanks the Applicant for the additional information, asks that the NIA scope is broadened to ensure the shop below is also assessed. Notes if further details need clarified with Airshed in terms of noise, can this be done via email.
- **5 February 2021** – the Application is refused.



Design Statement

Planning Application for Change of Use

104 Constitution Street, Unit 2
Leith EH6 6AW

4 December 2020
updated 26 April 2021

Update April 2021

This report has been updated following comments from the Environmental Health Officer and an update of the Noise Impact Assessment.

This summary identifies the changes in the information from the initial sumbission in December 2020.

Design Updates

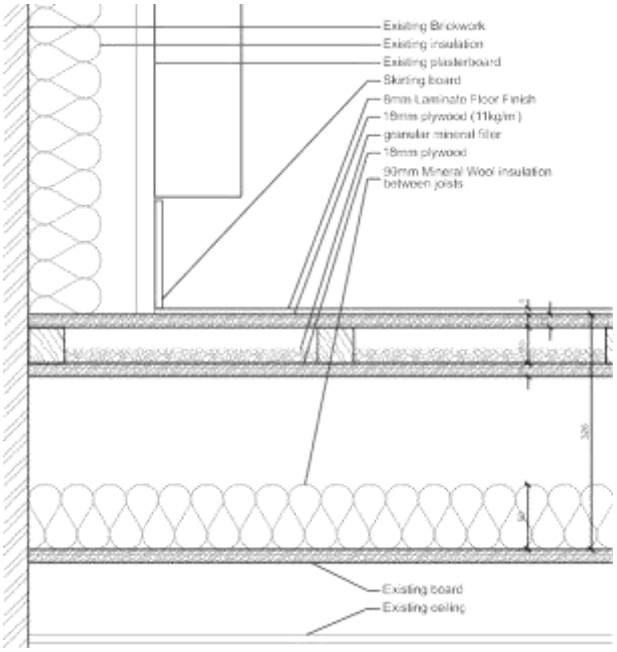
To address concerns regarding airbourne noise transmission from the restaurant and retail units below, we now include proposals to upgrade the floor as shown in the marked-up drawings and detailed in drawings 251-41000 (exisitng) and 251-41001 (proposed), excerpts of which are shown here.

This upgrade will cover the entire floor area that sits above the retail units and pend.

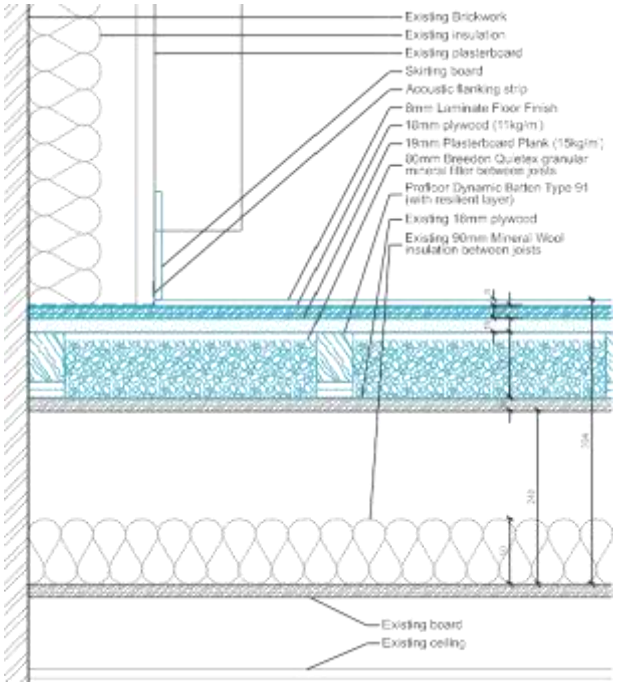
To eliminate the worst of the external plant noise, we propose to seal the window closest to the chimney to prevent it from opening. This will ensure noise levels within the proposed dwelling are below the standards set out in the revised Noise Impact Assessment.

This change has been reviewed against the Building (Scotland) Amendment Regulations 2020 (the latest amendments to the Scottish Building Regulations) to confirm that we do not require this window for ventilation or fire escape purposes and that all other aspects of the regulations have been considered. Due to the change of use, the development of this property is also subject to a Building Warrant being approved by the local authority.

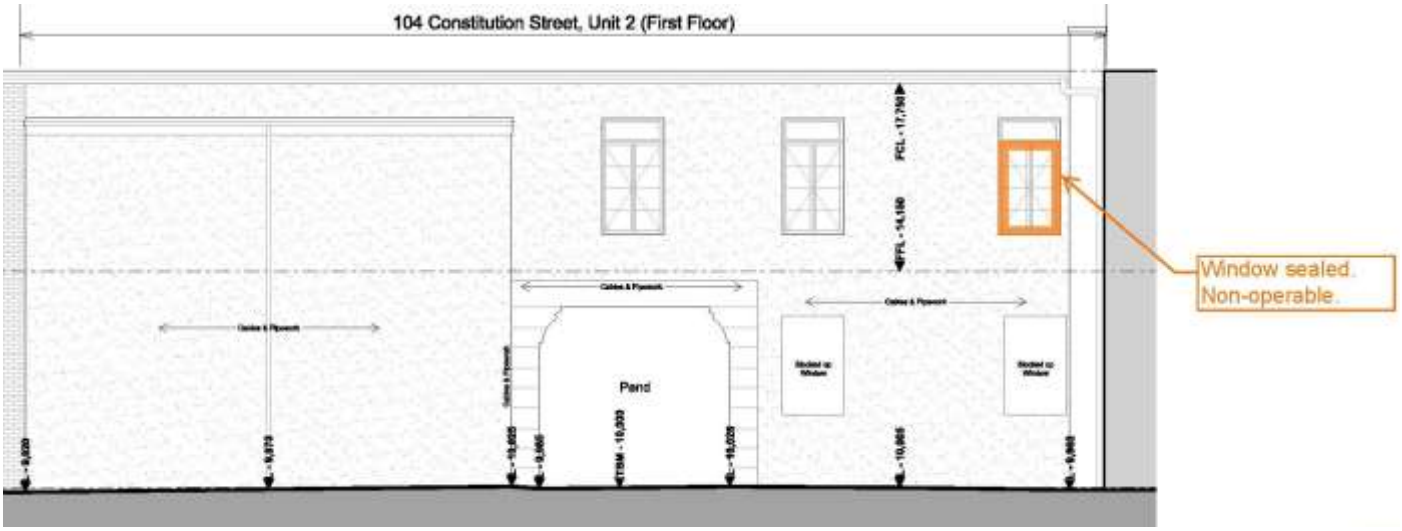
The rest of this report remains as submitted in December 2020.



Excerpt from drawing 251-41000 - Existing Floor Build Up



Excerpt from drawing 251-41001 - Proposed Floor Build Up



Excerpt from drawing 251-19220 - Proposed West Elevation

Constitution Street Elevation

Image showing internal fit out in 2015

Background Information

Address: 104 Constitution Street, Unit 2, Leith, EH6 6AW
Applicant: Robin Hogarth
Architect/ Agent: MICA Architects
Brief: Transform an open plan office into a single family occupancy open plan residential unit with 2-3 bedrooms and an open plan layout.

Site Details

The site comprises a first-floor office with a GIA of approximately 165m^2 located at 104 Constitution Street, Leith. The office has a secured protected entrance / stair which is shared with two other offices. The ground floor below the office is in use as a restaurant / bar.

The Applicant purchased Unit 2 within 104 Constitution Street in November 2020 with keys being exchanged in early December 2020. Ownership of the remainder of the building is split between several other organisations.

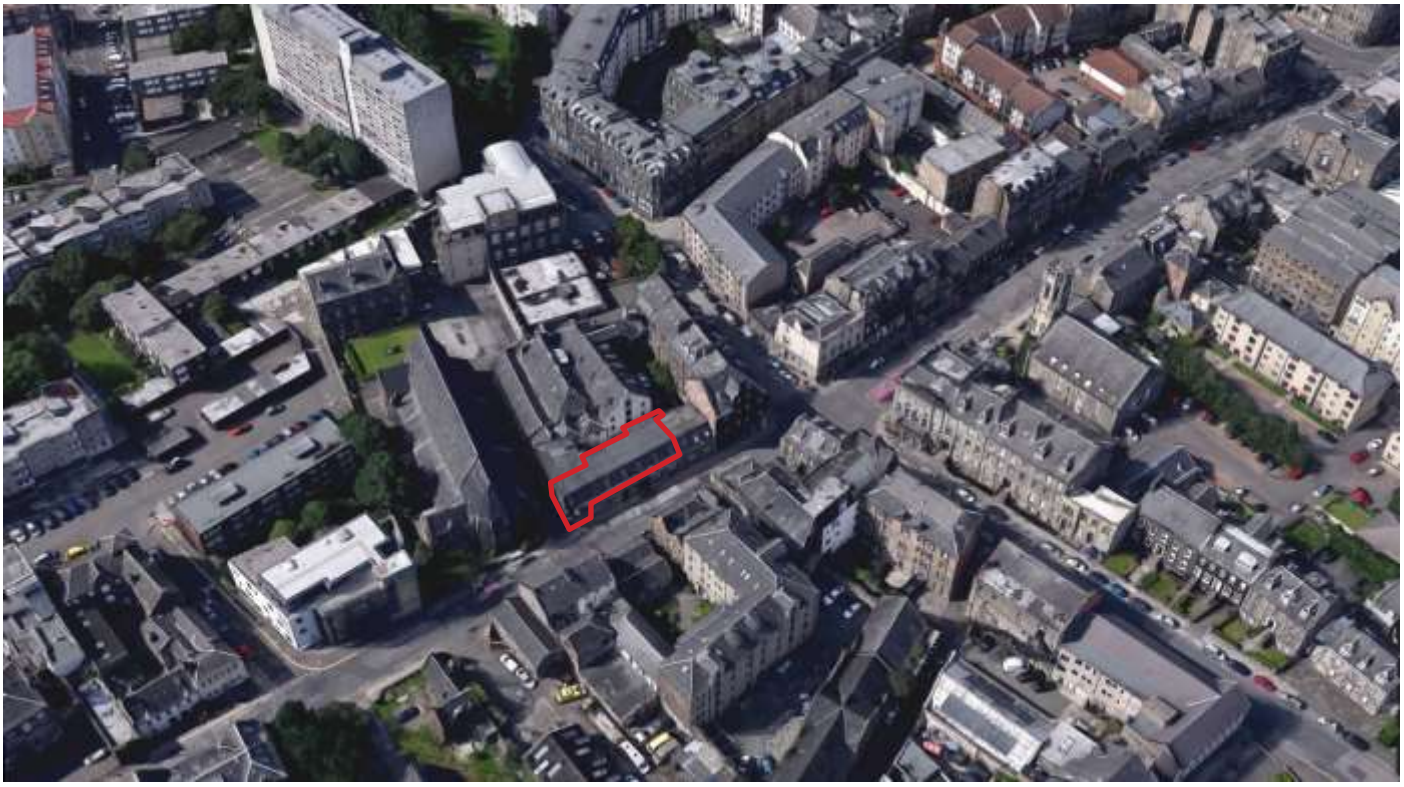
The title deeds refer to the site as ‘The Cork House’suggesting its historic warehouse use. The site hasbeen used as an office by the previous owner since2017 and there is evidence that it was an office for a period of time prior to this (at least since 2013). It understood that in approximately the 1980’s or 90’s the site was used as a nightclub, which is when the externalescape stair would have been introduced, though
the original spiral staircase has been replaced with a straight stair that has been subsequently enclosed in an extension to the rear of the property, along with theintroduction of the WC and tea kitchen.

The site is located within an Urban Area, as identifiedin the Local Development Plan (LDP), and is not designated for a specific use.

The site is B Listed and contained within the listing for96-104 (even numbers) Constitution Street and 3, 3AQueen Charlotte Lane (reference LB27351).

Image showing internal fit out in 2020

Excerpt from drawing 251-19220 - Proposed West Elevation



Aerial View showing site boundary in red

The building in which the site exists was built in 1887 by James Simpson. The listing describes the single storey row of 6 shops with mansard roof, pend and warehouse at right angle to rear. The Listing notes these are constructed in brick with painted stone fronts. There is a continuous fascia and dentilled cornice with blocking course as parapet, scrolled cast-iron balustrade with square ashlar dies. The shop fronts to right of the pend have panelled doors and stallrisers, shouldered-arched openings with slender mullions, panelled pilasters with foliate capitals; shop fronts to left of pend have plain stop-chamfered reveals.

The site lies within the Leith Conservation Area, with the Character Appraisal referring to Constitution Street as forming the eastern boundary to the central historic core of the Conservation Area, with Constitution Street itself resembling a town main street.

Site and Area Appraisal

Within the wider area there are a variety of uses, including residential, retail, offices, restaurants, bars, and cafés. Leith Links is a short walk from the site, providing an area of high-quality open space. The site is also well connected to the public transport network with bus stops a short walk away at The Shore and Leith Walk. The proposed Edinburgh Tram will also provide connections from the site, immediately opposite the site on Constitution Street. The tram works are currently underway.

There are multiple other B and C Listed Buildings neighbouring the site.

There is evidence of other historic warehouse units being transformed into residential accommodation in the immediate area. The Buildings to the rear of the site

Constitution Street Elevation



Rear of the property


Pend running below the property to provide access to the rear

on Queen Charlotte Lane now contain residential units and several of the upper units on Constitution Street are also now residential accommodation.

Design Principles

This development has had advice from the City of Edinburgh Council's Planning Pre-Application Advice Service. The advice letter provided has been adhered to, with changes to the scope of this application to minimise impact on the listed building.

The proposals have been developed in the context of the following Guidance:

SES Plan and Edinburgh Local Development Plan (ELDP)

Policy Env 3 - Listed Buildings - Setting
The proposals will not be detrimental to the architectural character of the listed building. The original timber features are to remain exposed and celebrated through the proposed fit out.

Policy Des 1 - Design Quality and Context
The proposals do not impact on the physical environment external to the building. All efforts have been made to maintain the internal quality of space and all materials used are in keeping with those already present and with the intent of preserving the historic features. The unit changing to residential use will enhance the diverse community of users and will provide out of hours custom and activity which will enhance the sense of place and community.

Location plan showing site in relation to Leith Links

Policy Hou 5 - Conversion to Housing
The proposed single occupancy residential unit is 165 sqm GIA with a dual aspect situation with windows along opposing elevations. There is residential use within neighbouring buildings on the upper levels, in a similar situation as proposed, where they may have once been warehouse or office space.

While there is no private external amenity proposed, the close proximity of Leith Links provides high quality landscaped open space, available within a 5 minute walk of the site. Secure cycle and waste storage is provided at the base of the private access stair to the rear of the site. This development is proposed as car-free.

The pre-app advice letter received from CEC advised that a noise and ventilation report assessment should accompany the application to ensure that future occupiers would have a reasonable level of amenity and would not be subject to unacceptable levels of noise and odours emanating from the class three unit at ground floor. The requested reports form part of this application.

Policy Hou 7 - Inappropriate Uses in a Residential Area
The immediate area around the site contains a mix of uses including residential, office, retail, restaurant, and cafe. The change of use of this unit from office to residential is in keeping with this mix and will help to enhance the residential aspect of this mix and to contribute to the 'out of hours' activity within the area.

Policy Tra 2 - Private Car Parking
The site has a PTAL rating of 6 with significant access to public transportation in the form of buses and soon trams. Therefore, this proposal excludes any dedicated/ private car parking spaces. There is on-street car parking available without charge in the immediate area should parking be required for any short or long term period.

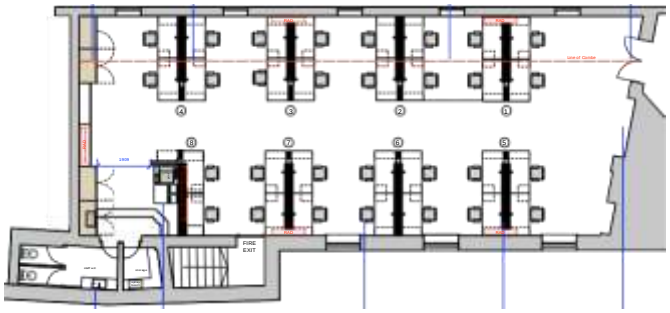
Policy Tra 3 - Private Cycle Parking
The proposals include for 2 secure cycle parking spaces at ground floor level at the base of the private access stair. This area is not accessible to any other party and has an access stair connecting it directly with the residential accommodation on the first floor. The parking provision is for high level/ hanging spaces to clear the stair, but with a mechanism to ensure easy use and access.

Historic Environment Policy for Scotland
The proposals have been developed with the following policies in mind: HEP1, HEP2, HEP4, HEP5. The proposals seek to retain all of the existing heritage features and retain the open plan nature of the space. The fit out proposed allows for its easy removal in future without damaging the historic fabric and structure.

Edinburgh Design Guidance (EDG) has been consulted and used as a reference while completing the proposals.

Public Involvement
While there has been no formal public consultation, the Applicant and his agents have had informal discussions with the immediate neighbours of the site. There have been no objections raised to the proposals to date.

Programme
The implementation of the proposals is planned to commence as soon as all requisite permissions are granted - ideally in Spring 2021. It is expected that these works will take approximately 8 weeks to complete.



First Floor Plan showing previous owner's office accommodation

Main Entrance with secure entry phone

Design Solution

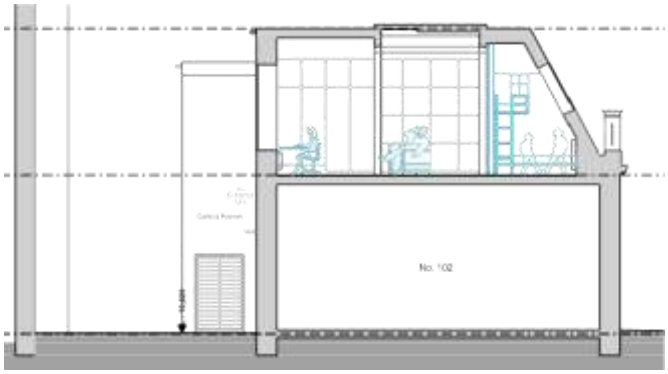
It is proposed to change the use of the office and convert into a single occupancy residential unit with 2-3 bedrooms. The proposals include the introduction of a kitchen, shower, and non-structural walls to enclose two bedrooms and ancillary storage. A third bedroom is proposed to be open plan, with a curtain providing privacy from other areas when desired.

The current WC area, which includes two toilet cubicles, is to be altered allowing for a shower facility. The existing tea kitchen will house a washing machine and remain a utility room.

The existing fire escape is not required as part of this development, however it is to be retained as an access stair providing a private link to the ground floor where cycle and waste storage provision is made. The existing door will be refurbished to provide secure access from both sides.

The main entrance to the unit is on Constitution street and is shared with the Unit 1 and 3 of the same address, which are both office spaces. A secure entry phone provides access to a shared protected stairwell, with a separate stair accessing the front door of the unit.

There are no external alterations proposed to the building.



Section A-A

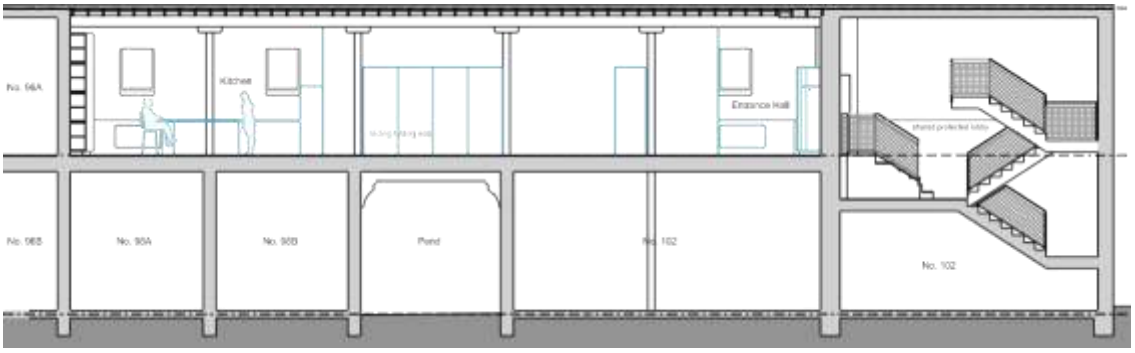
Section C-C

Sustainability

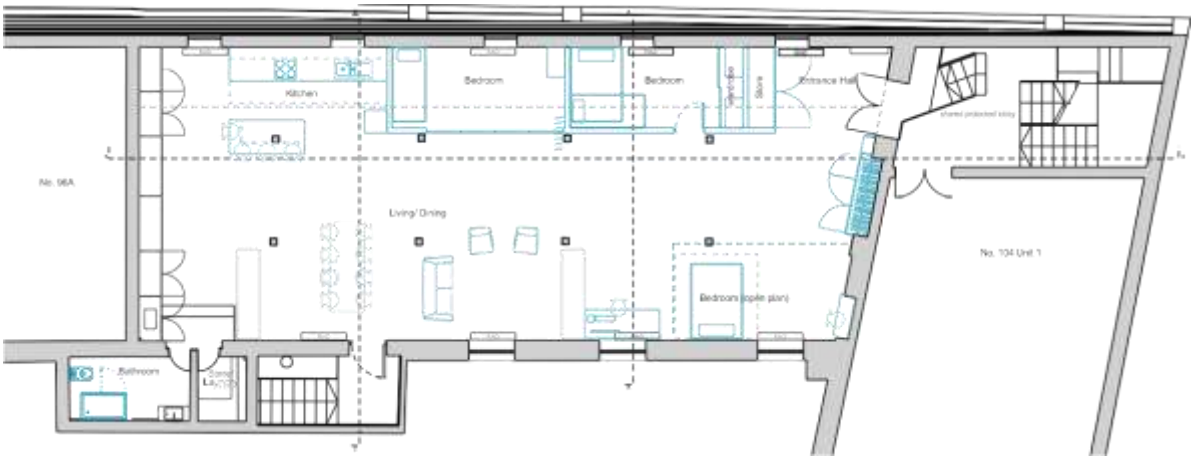
The proposals intend to improve the sustainability of the unit. The existing windows in the property are double glazed, however it is unclear how much insulation is present in the ceiling and floor. Intrusive investigations have not yet been undertaken, but it is the applicant's intention to improve the thermal performance (as well as noise and fire separation) to meet the current Building Standards. A new boiler is required, which will be of the highest standards available readily on the market. The current heating system is electric, which is proposed to be retained.

Internal open plan space

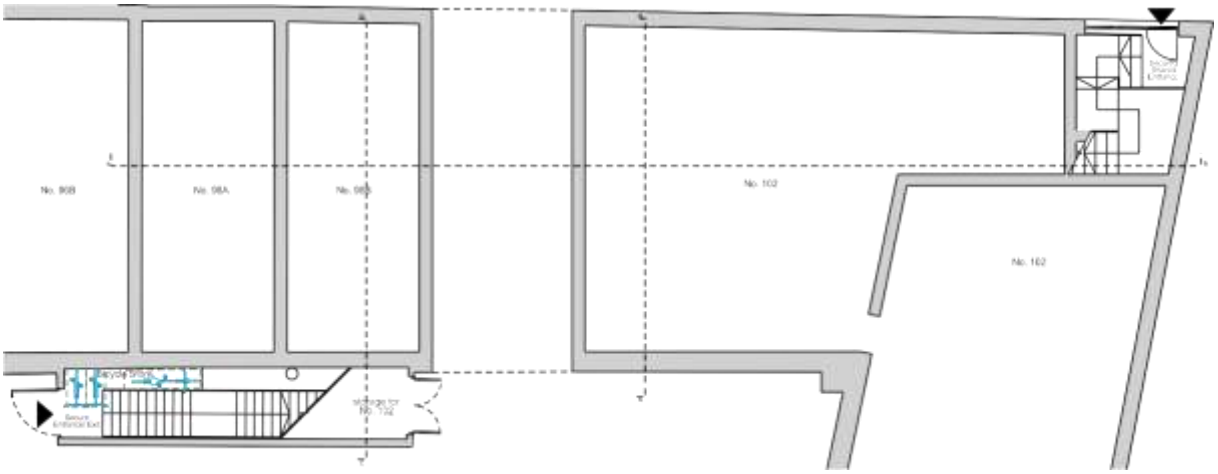
Stair to front door



Section B-B



Proposed First Floor Plan



Proposed Ground Floor Plan

Former escape stair (access stair)

Door to access stair-ground level

Internal doors to access stair, utility room, WC (left to right)

Rhiannon Martin

From: Kelly Ordemann <kordemann@micaarchitects.com>
Sent: 23 February 2021 17:26
To: alan.moonie@edinburgh.gov.uk
Cc: Jenny Hogarth
Subject: RE: 20/03771/PREAPP & 20/05447/FUL

Dear Alan,

Many thanks for your call last week to discuss my email below. I appreciate the time you took to respond and discuss with me, it was very useful.

Your thoughts regarding the review and submitting revised/ additional information was that you've not experienced the committee rejecting such information and in these circumstances you felt they are very likely to accept it, and that going to Review was a sensible next step.

With regards to Stephen's comments regarding residential over a licensed premises, you felt he may have mis-interpreted concerns arising from residential over and around pubs. The unit below is a restaurant and not a bar or pub. You also mentioned that in the opposite scenario where you have an application for a restaurant below residential you would normally allow this and often approve these change of use applications. Therefore there should be no issues in principal with our proposed change of use, subject to the Environmental Health Officer being happy with the amenity.

If I have mis-represented anything discussed, please do let me know.

Again I want to thank you for your time and call.

Regards,
Kelly

Kelly Ordemann
kordemann@micaarchitects.com

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From: Kelly Ordemann
Sent: 11 February 2021 17:29
To: alan.moonie@edinburgh.gov.uk

Cc: Jenny Hogarth [redacted]
Subject: 20/03771/PREAPP & 20/05447/FUL

Dear Alan,

I am writing in relation to the Pre-application advice received from yourself for a change of use application at 104 Constitution Street in Leith last Autumn (Ref 20/03771/PREAPP) and the subsequent change of use application (Ref 20/05447/FUL).

As you provided us with Pre-application advice, I wanted to update you on the progress of applications related to this property and to ask advice on our next steps.

We submitted a change of use application (excluding the external amenity spaces which had been included in our Pre-App) in early December and it was validated on the 14 December 2020 with Stephen Dickson being assigned the case officer and a determination date of 05 February 2021. We heard nothing regarding the application until comments from the Environmental Health Officer were uploaded to the portal on the 29 January 2021 with some concerns and questions. These comments had been sent to Stephen in an email on the 15 December, but were not sent to us nor made available to us until one week before the determination deadline. We quickly mobilised our team to respond to the comments and initiated dialog between myself, the Case Officer, and the Environmental Health Officer, but to provide the required evidence it was clear that further testing would be required, which we were able to agree to undertake thanks to the manager of the restaurant agreeing to 're-open' his kitchen for us. We put these proposals to the Environmental Health Officer who accepted that he would then be able to assess the application. Unfortunately Stephen refused to grant us an extension to the determination deadline and formally objected to the application on the 05 February.

In our email exchange, Stephen Dickson also referred to the Council's position to our application with these terms*: we would never normally approve residential over an existing licenced premises.* He continued to refer to this alongside the concerns from the EHO in his emails and seems to be heavily relying on this principle in his objections. As you undertook our Pre-Application review, and there is no mention of any tendency or serious concerns relating to a residence over a licensed premises, I was wondering if you could provide comment or clarity on his position – is the council pre-disposed to object to a change of use to residential if the property sits over an existing licensed premises?

We feel that we were unreasonably denied an opportunity to address the concerns of both the EHO and Planning Officer, especially given the additional challenges of lockdown during this time. We would like to submit the application for Review, however would like to gain some comfort that our revised Noise Impact Assessment and Odour Impact Assessment will be accepted. We understand that under local review regulations we can only provide the information available to the case officer at the time of their decision. In this case, due to the refusal to allow us to undertake further tests and update our report, we will be relying on submitting additional information in order to secure a positive outcome. Considering that we had agreed a methodology and plan with the Environmental Health Officer, but were denied the opportunity to complete the exercise by the case officer (also bearing in mind that we only had the EHO's comments one week prior to the determination deadline), I am hoping you can give us some comfort that our updated reports will be accepted and considered as part of the review?

Kind regards,
Kelly

Kelly Ordemann
kordemann@micaarchitects.com

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Gold Award Architect of the Year 2020
Refurbishment Architect of the Year 2020

Jenny Hogarth
124 Brunton Gardens
Montgomery Street
Edinburgh
EH7 5ET

By e-mail

Dear Jenny

Environmental Noise from Chop House
Affecting Proposed Dwelling at 104 Constitution Street, Leith

I refer to the above project, which proposes a change of use from office to residential at Unit 2, 104 Constitution Street, Edinburgh EH6 6AS [Pre-application Reference No. 20/03771/PREAPP] and your instruction to conduct an environmental noise impact assessment for the scheme. The site location is shown in Figure 1. This letter report has been updated to take account of the comments made by the City of Edinburgh Environmental Health by email to the applicant's architect on 20th April 2021 and a subsequent follow-up email on 26th April 2021.

I understand that you are currently seeking planning permission to change the use of the 1st floor office into a single 'loft-style' residential apartment. Further details of the project are presented in Appendix 1. The City of Edinburgh's Environmental Protection has advised that you will need to submit a noise impact assessment to consider the impact from the Chop House restaurant. The main potential noise impacts from the Chop House are likely to arise from amplified music, kitchen noise and noise from fixed plant. This noise impact assessment has been updated to take account of CEC's requirements. The measurements were conducted in accordance with a protocol agreed with CEC. Further details of the measured levels are presented in Appendix 2.1. This report includes the results from additional surveys at the site to quantify noise from fixed plant and includes predictions for tram and other transport activities within Constitution Street.

Noise transmission through ceiling/floor structure to proposed apartment

We have conducted measurements of noise in the downstairs restaurant, where the average noise was 76 dB $LA_{eq,\ 10\ minutes}$, with peak noise levels of up to 86 dB LA_{max}. From discussions with the restaurant's management, we believe that this is likely to be pessimistic in terms of normal operational practice at the restaurant.[1] The simultaneous average noise level measured in the upstairs apartment was 38 dB $LA_{eq\ 10\ minutes}$. The measured levels in the apartment are likely to be significantly affected by background ambient sound from other extraneous sources. Our estimate of background ambient sound in the apartment (windows closed, all restaurant activity off) is ~37 dB $LA_{eq\ 10\ minutes}$. All measurements included 1/3rd octave band measurements, which indicate the relative performance of the floor across the range of frequencies between 20Hz – 20kHz.

[1] This test was conducted to allow an assessment of music noise in the upstairs apartment to enable a comparison to NR15 (the standard CEC test for inaudibility) and does not constitute a test in accordance with the more exacting requirements of BS EN ISO 140-4 Acoustics - Measurement of sound insulation in buildings and of building elements – Part 4: Field measurements of airborne sound insulation between rooms.

Thus, the floor achieves ~30 dB attenuation at 125Hz, ~40 dB at mid-range frequencies (200 – 400Hz) and >50 dB at frequencies above 500Hz, not taking account of the contribution from ambient background sound. The average measured levels in the restaurant and apartment are plotted in Chart 1a at the end of the text. This includes the estimated background ambient sound from unrelated activities. The estimated attenuation provided by the intervening floor is presented in Chart 1b at the end of the text. The measured noise from music in the apartment is plotted in Chart 1c. This indicates that the music from the restaurant under the conditions of the test would exceed NR15 in the apartment by up to 16 dB at 125 Hz. [See details in Table 1]. The apartment was unfurnished at the time of the test and with hard reflecting surfaces and no absorbent surfaces. Even allowing for a less reverberant apartment and a reduced music level, it is likely that music from the restaurant would be audible in the upstairs apartment. This conclusion is consistent with the observations recorded by our survey technician, who noted that noise from music was clearly audible in the apartment under the conditions of the test and just audible at low frequencies when the music level in the restaurant was turned down to 'normal' levels. Based on the results of this survey, airborne noise transmission through the floor is inadequate at frequencies between 63Hz and 250Hz and additional attenuation is required for any reasonable prospect of the floor complying with CEC's requirements for inaudibility.

The project architect has conducted further investigation to confirm the existing floor layout. [See detail in Appendix 1]. The existing floor has an estimated density of 89kg/m^2. The attenuation required is substantial. Accordingly, it is proposed to increase the mass of the floor to >180kg/m^3 using a combination of dense granular material, mineral wool, plywood and plasterboard. The detail of the measures proposed to improve the sound attenuation of the floor between the restaurant and the apartment are also shown in Appendix 1. All flooring panels shall be offset to minimise noise breakout. The joints of all panels shall be taped. The joints around the edges between the plasterboard and the walls shall be sealed with a resilient acoustic sealant. No holes shall be made in the flooring (e.g. by drilling or cutting) for services. The floor detail shall include resilient strips at the walls and skirtings, to minimise flanking transmission. This robust detail is likely to significantly improve the performance of the floor.

CEC Environmental Health has requested that the potential impact from the ground floor retail premises should also be taken into account. The proposed floor design discussed above will extend across the entire 1st floor apartment. The results from the test in the downstairs restaurant and the proposed upgraded floor should ensure that noise from any reasonable use of the permitted retail premises would be unlikely to cause loss of amenity in the upstairs apartment.

Noise from Fixed Plant (Scenario 1)

Measurements were conducted close to the source of the restaurant's kitchen local exhaust ventilation (LEV) system, an air conditioning heat exchange condenser unit and the rear access to the restaurant kitchen door. Measurements were also obtained in the apartment with windows open and windows closed. The measured levels for the air conditioning condenser unit and the LEV are plotted in Charts 2 and 3 respectively, with no adjustment for extraneous noise from the ambient background. The measured levels are plotted and compared to NR25 in Chart 4. This shows that the measured levels from

fixed plant inside the apartment, with windows open, exceed NR25. These measurements are significantly compromised by the contribution from the ambient background sound unrelated to the restaurant activity. The baseline ambient sound level during the course of the surveys was too variable to reliably determine the contribution from extraneous (unrelated) noise within the proposed apartment.

Accordingly, the source estimates have been used to predict the combined noise from fixed plant (LEV, condenser unit and breakout through kitchen door) using the procedure set out in ISO 9613[2] as implemented by SoundPlan 8.2 ® (Scenario 1). ISO 9613 specifies an engineering method for calculating the attenuation of sound to predict noise levels at a distance from a variety of sources. The method predicts the equivalent continuous A – weighted sound pressure level (LA_{eq}) under meteorological conditions favourable to propagation from sources of known sound emission.

ISO 9613 may be applied to the prediction of noise from industry and many other ground-based sources. This prediction technique is considered to be appropriate for the noise sources under consideration in this assessment. The model includes for geometrical divergence, atmospheric absorption, ground effects, reflection from surfaces, and screening by obstacles. The model allows for the use of correction factors for ground cover. For hard surfaces such as water or tarmac the correction is applied simply as 3 dB for all frequencies and distances. Where the ground cover is soft, such as grass, woodland, or other less reflective material, an empirical relationship between ground attenuation and frequency and distance may be used. Hard ground has been assumed across the study area.

These predictions assume downwind meteorological conditions which are favourable for noise propagation from the source to a receiver, where the predicted noise level is seldom exceeded. The estimated accuracy using this method is $\pm$3 dBA. The estimate of error in the ISO Standard is based on situations where there are no effects of attenuation due to screening.

The proposed layout was obtained from drawings provided by the applicant. The detail of surrounding site receptors and ground conditions was obtained from a site centred OS map at scale 1:1250, OS Terrain 5 spot ground height levels and a site walkover. Variations in local ground heights were taken into account. A digital model of the ground and buildings was constructed. The model layout for fixed plant noise prediction (Scenario 1) is shown in Figure 2. The detailed results from this prediction are presented in Appendix 3.

The predicted combined noise from the fixed plant (based on the measurements close to source) are considered in prediction model Scenario 1. The predicted noise levels inside the apartment with windows open are presented in Table 2 and plotted in Chart 5. This Scenario assumes that the chiller unit may be operated on a 24-hour basis and that the kitchen LEV does not operate at night, after 23:00 hours. This Scenario assumes that the apartment window closet to the LEV is a sealed unit. The project architect has confirmed that there is sufficient ventilation within the apartment if this window is not an opening window. The results from this Scenario indicate that the noise from fixed plant is predicted

[2] ISO 9613:1996 (E) Acoustics – Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere; and Part 2 : General method of calculation.

to comply with NR25 during both the daytime and at night.[3] This assumes a reduction of 15 dB through an open window. In considering the attenuation provided by windows, the latest WHO Guidance states: '*The differences between indoor and outdoor levels are usually estimated at around 10 dB for open, 15 dB for tilted or half-open and about 25 dB for closed windows.*'[4] Traditionally acousticians have used a value of 10 – 15 dBA based on the old WHO 1999 Community Noise Guidelines. The estimate of attenuation proposed in the WHO's latest Guidance is based on more recent research[5], which reflects improvements in standard window attenuation over the last two decades.

Noise from Tram and Road Traffic (Scenario 2)

There is currently no road traffic on Constitution Street, due to the preparatory construction works for the extension of the tram network. At the request of CEC, we have conducted an assessment of noise from running trams in Constitution Street based on a noise prediction model. Single event levels (SEL) for tram noise were obtained for free-flowing tram movements on North St Andrew's Street. The results from this survey are presented in Appendix 2.2.

The model setup and building configuration used for Scenario 1 have been adopted for assessing noise from transport. Noise from trams at the proposed apartment has been predicted based on these SEL values, assuming ten tram movements on each line averaged over the sixteen hour day (07:00 – 23:00). Noise from the trams has been modelled as two line sources 0.5m above local ground level. The noise model layout is shown in Figure 3. The detailed model outputs are presented in Appendix 3,

Noise from road traffic has been predicted using DoT CRTN 1988, as implemented by SoundPlan 8.2. I have assumed that there will be up to 12 bus movements (as HGVs) and 50 taxi movements (as LDVs) on the road per hour, assuming a 20mph speed limit.

This indicates that the overall worst-case transport noise level at the most exposed window in the apartment would be 58 dB $LA_{eq\ 07:00\ -\ 23:00}$. Noise levels on the sheltered elevations are predicted to be <40 dB $LA_{eq\ 07:00\ -\ 23:00.}$ These predictions are free-field, outside. The contribution from transport noise at the most adversely affected (worst-case) receptor includes a substantial contribution from road traffic noise (56 dB $LA_{eq\ 07:00\ -\ 23:00}$), which is likely to be pessimistic. The detailed results for this Scenario are presented in Appendix 3.

The results from this assessment indicate that transport noise levels inside the proposed apartment are likely to comply with the requirements of BS 8233:2014 Table 4, assuming closed windows.

Kind regards

[redacted]

Steve Fraser *BSc MPhil CEnv MIoA MCIWM*

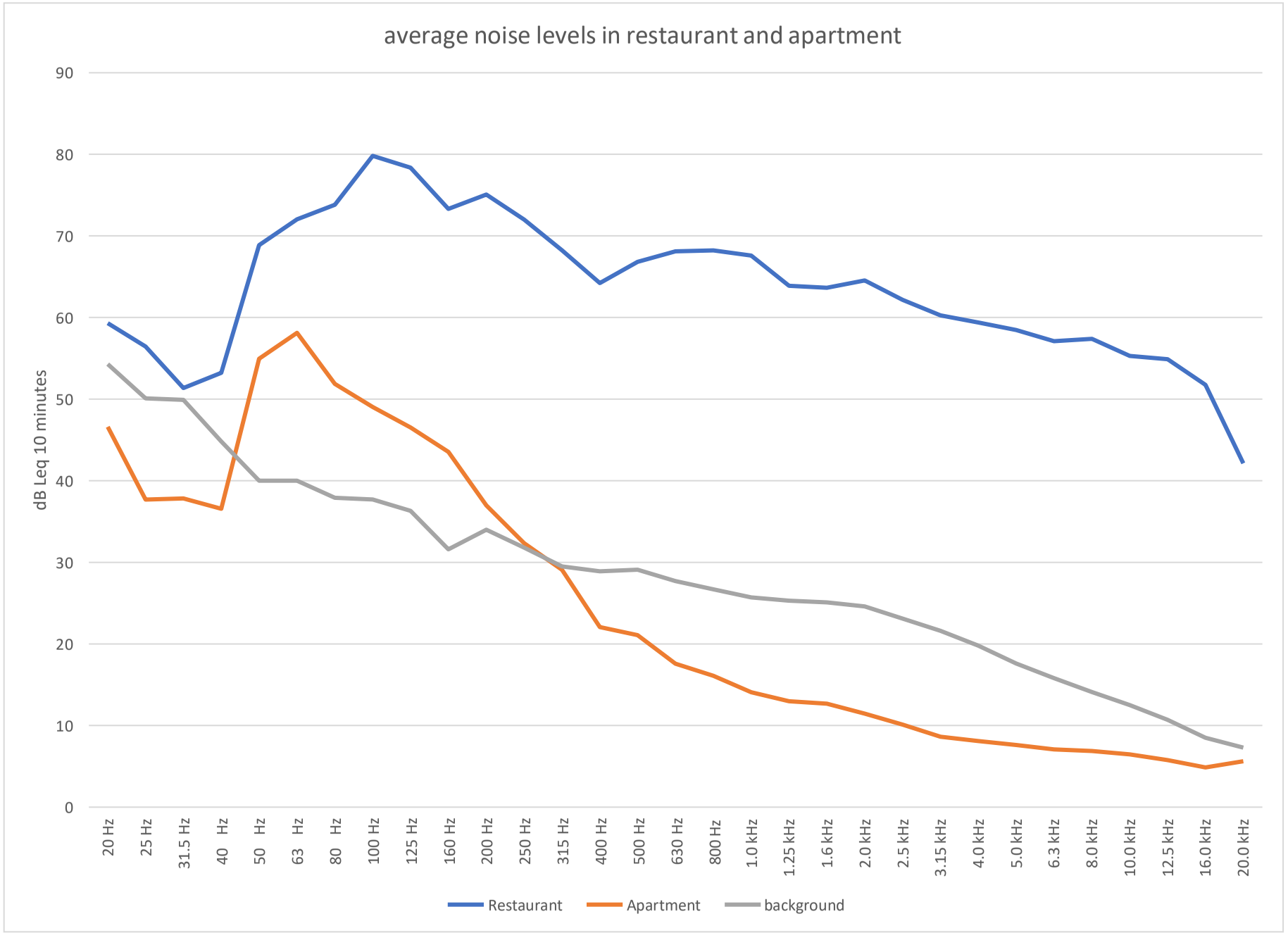
[3] The predicted noise levels at the proposed sealed window in Scenario 1 have been struck out in the model outputs presented in Appendix 3 (pages 74 – 79 inclusive in the pdf report) and have been discounted. The predicted external free-field noise levels at the worst-case opening window are highlighted in yellow.
[4] WHO 2018. Environmental Noise Guidelines for the European Region Section 2.2.2 page 9
[5] Barbara Locher et al. 2018. Differences between Outdoor and Indoor Sound Levels for Open, Tilted and Closed Windows. International Journal of Environmental Research and Public Health 2018 15,149. This reported a mean value of 16 dBA for tilted windows.

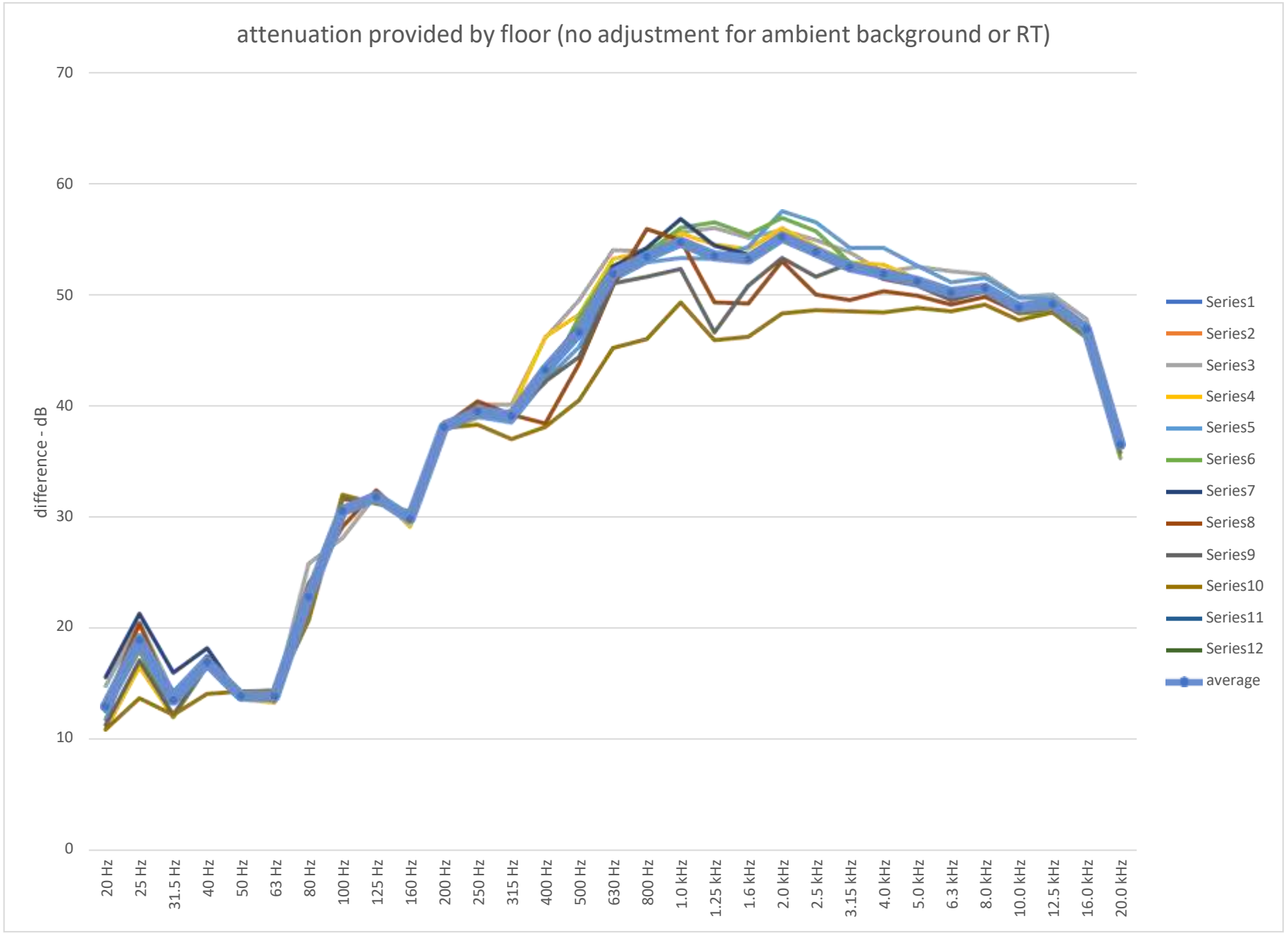
Tables

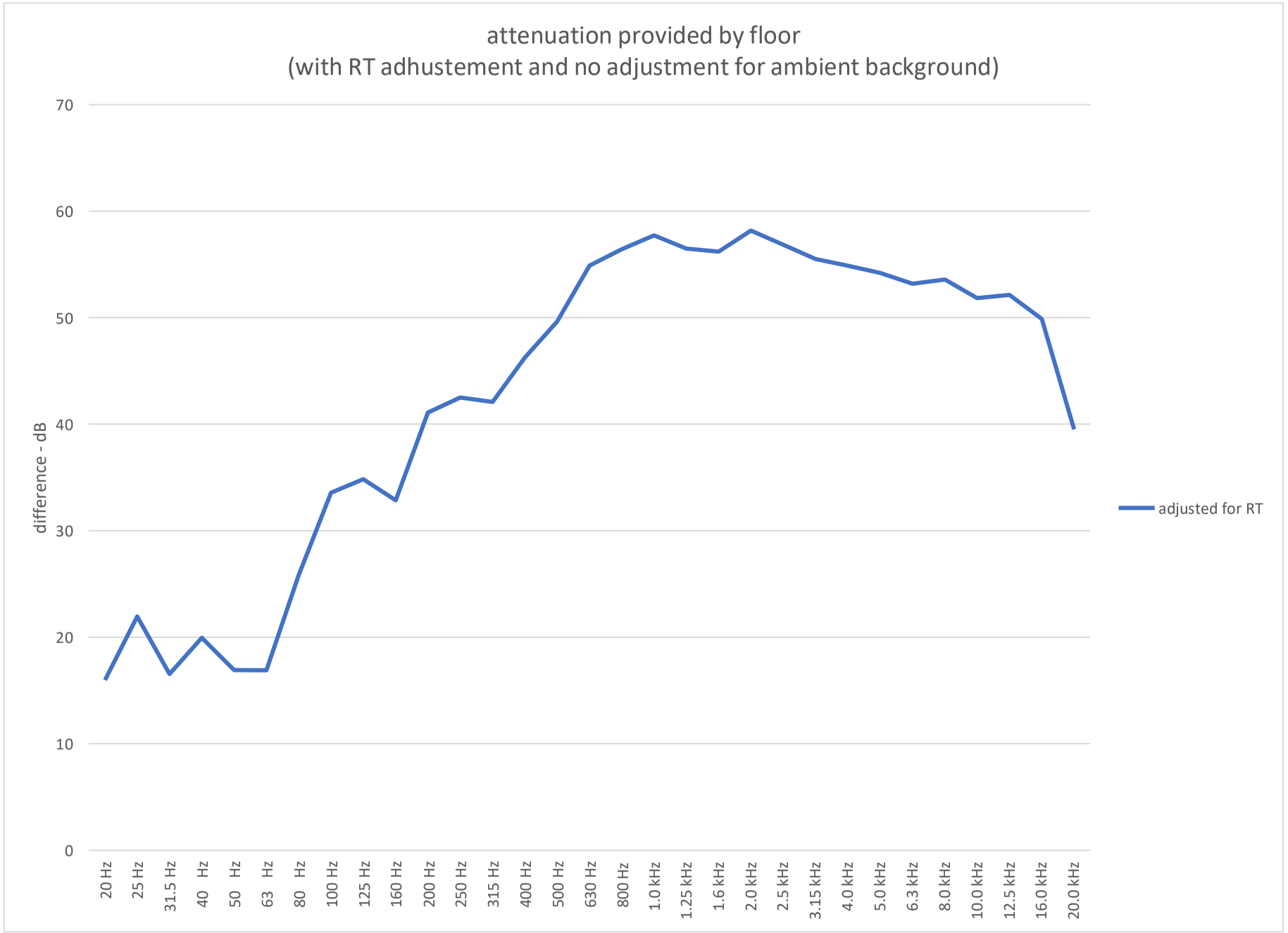
Description	Frequency (Hz)	31.5	63	125	250	500	1 000	2000	4000	8000
	units	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*
	LEV inside (open window)	57	45	48	45	46	45	37	31	25
	heat exchanger (open window)	54	42	43	40	34	32	30	25	18
	music	48	60	52	39	25	19	16	13	12
	kitchen door	54	42	43	38	35	34	29	23	17
	music - background	0	60	51	34	0	0	0	0	0
measured levels	background	57	44	41	37	33	31	29	25	19
Noise Rating Curves from Table B1 BS 8233:2014	NR25	72.4	55.2	43.7	35.2	29.2	25	21.9	19.5	17.7
	NR15	65.6	47.3	35	25.9	19.4	15	11.7	9.3	7.4
Compliance (internal level - NR)	music (no adjustment for background)	-18	13	17	13	6	4	5	4	4
	music (with adjustment for background)	-66	13	16	8	-19	-15	-12	-9	-7

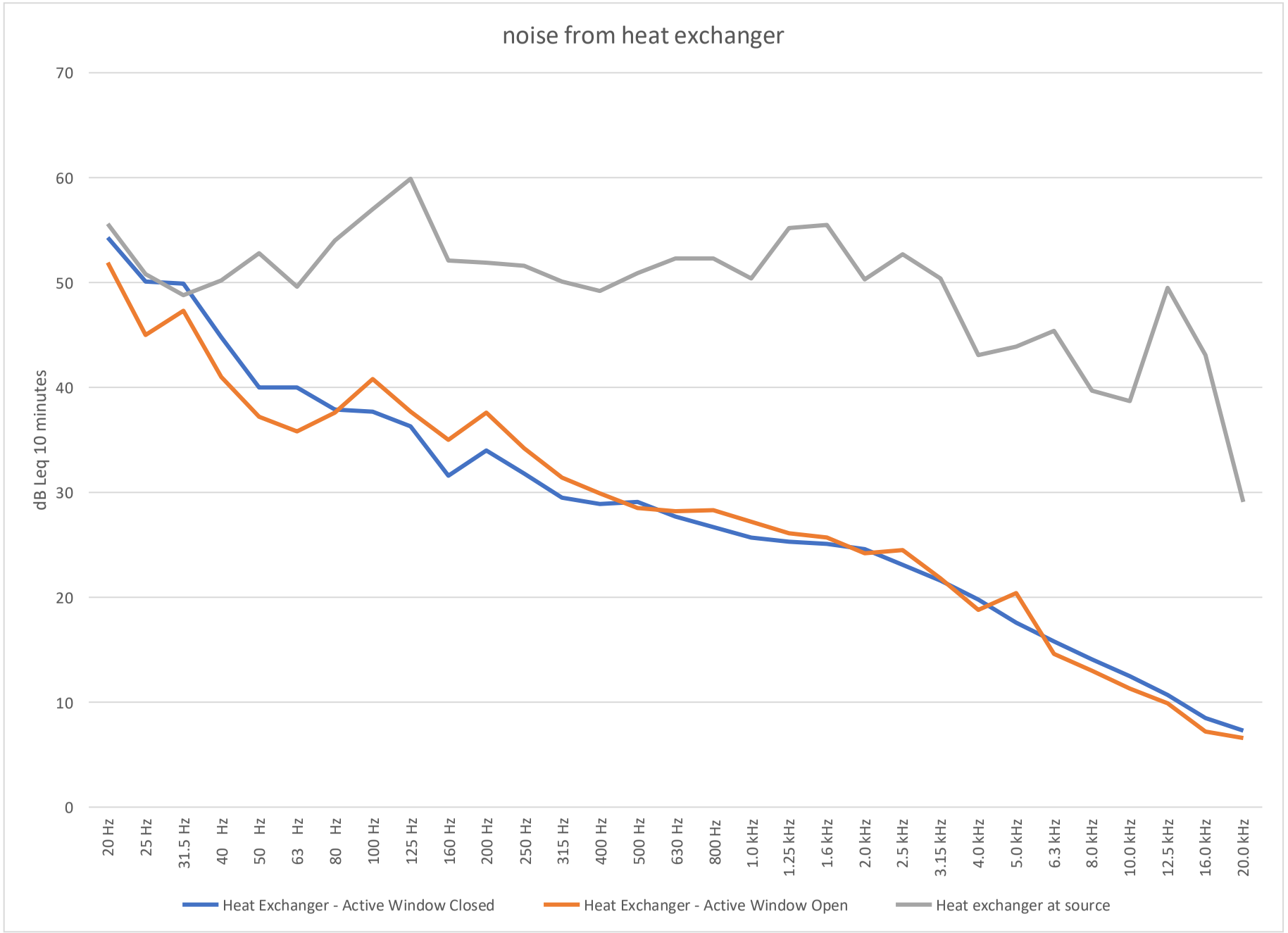
Description	Frequency (Hz)	125	250	500	1 000	2 000
	units	*dBA*	*dBA*	*dBA*	*dBA*	*dBA*
Noise model output - excluding worst case receptor	Predicted Noise Daytime (external)	30.6	33.6	38.8	39.1	34.5
	Predicted Noise Night-time (external)	18.1	19.6	24.9	29.7	30.8
from Table A.1 BS 8233:2014	correction dBA to dB	-16.1	-8.6	-3.2	0	1.2
	correction dBA to dB	-16.1	-8.6	-3.2	0	1.2
Corrected levels from dBA to to dB	Predicted Noise Daytime (external)	46.7	42.2	42	39.1	33.3
	Predicted Noise Night-time (external)	34.2	28.2	28.1	29.7	29.6
Assumes 15 dB reduction from outside to inside	Predicted Noise Daytime (inside)	31.7	27.2	27	24.1	18.3
	Predicted Noise Night-time (inside)	19.2	13.2	13.1	14.7	14.6
Noise Rating Curves from Table B1 BS 8233:2014	NR30 (daytime)	48.1	39.9	34	30	26.9
	NR25 (night-time)	43.7	35.2	29.2	25	21.9
Compliance (internal level - NR)	daytime	-16	-13	-7	-6	-9
	night-time	-25	-22	-16	-10	-7
Compliance (internal level - NR)	daytime	-12	-8	-2	-1	-4
	night-time	68	57	45	35	29

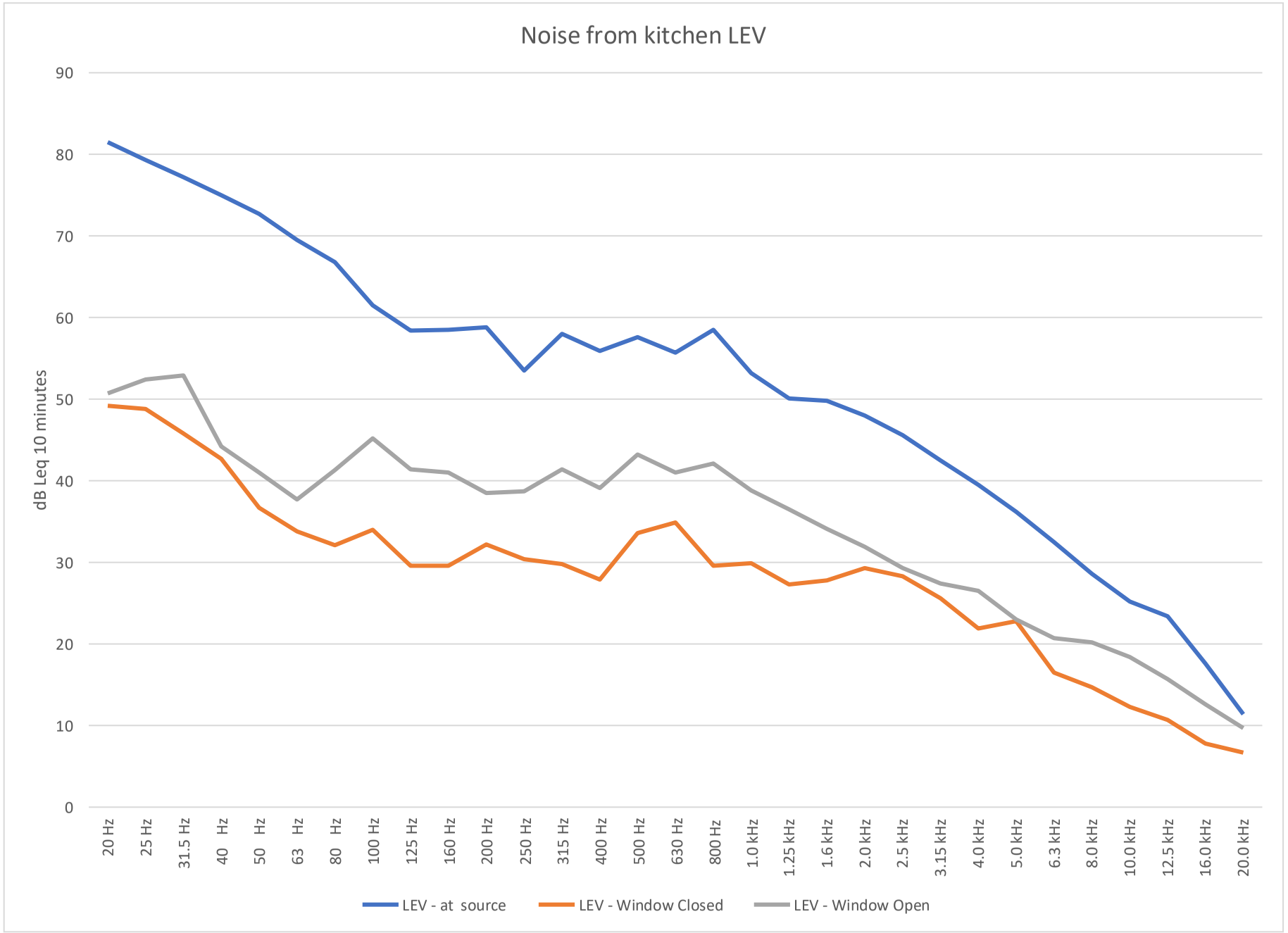
Charts

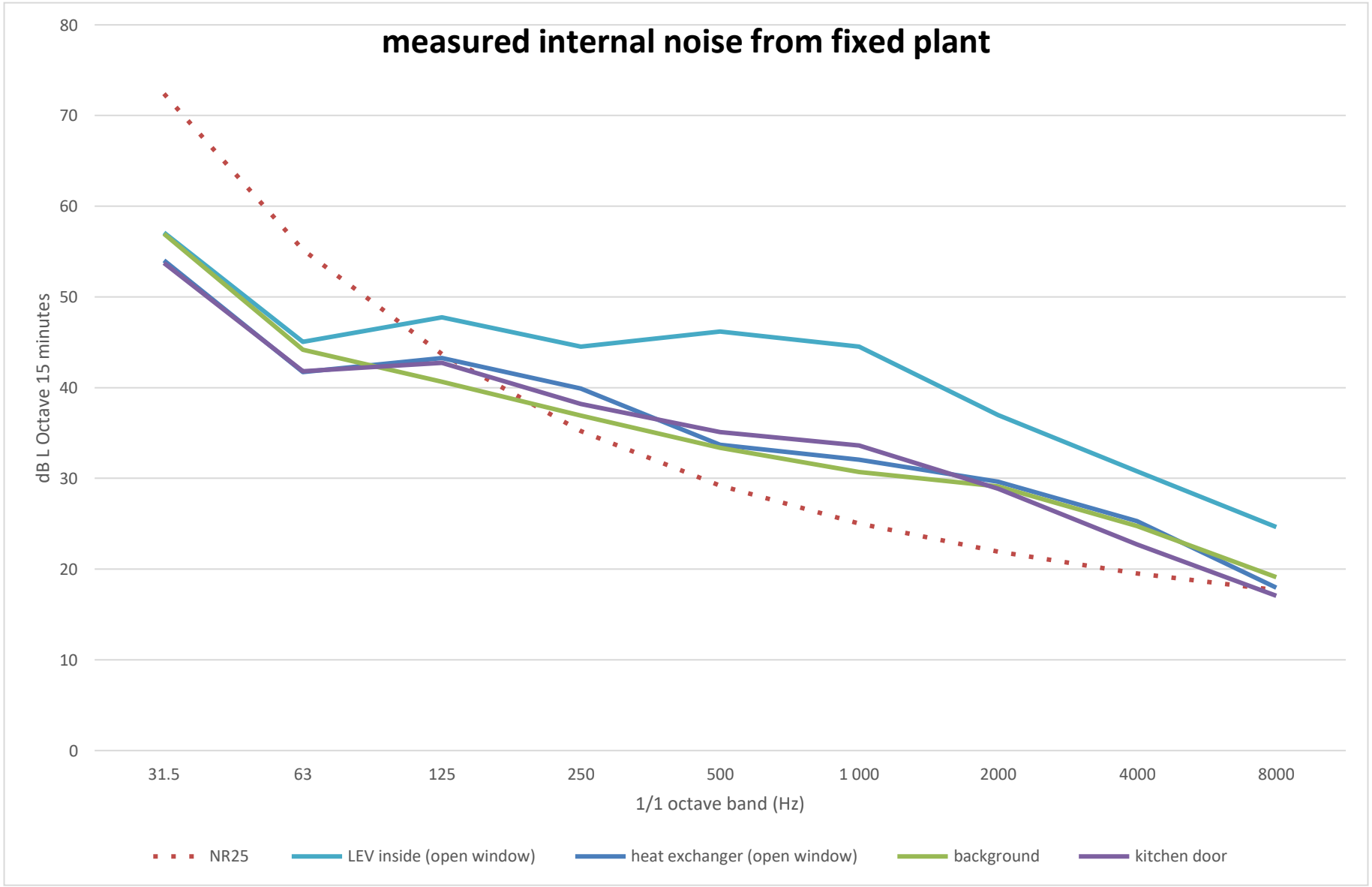

average noise levels in restaurant and apartment
dB Leq 10 minutes
90
80
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
Restaurant
Apartment
background

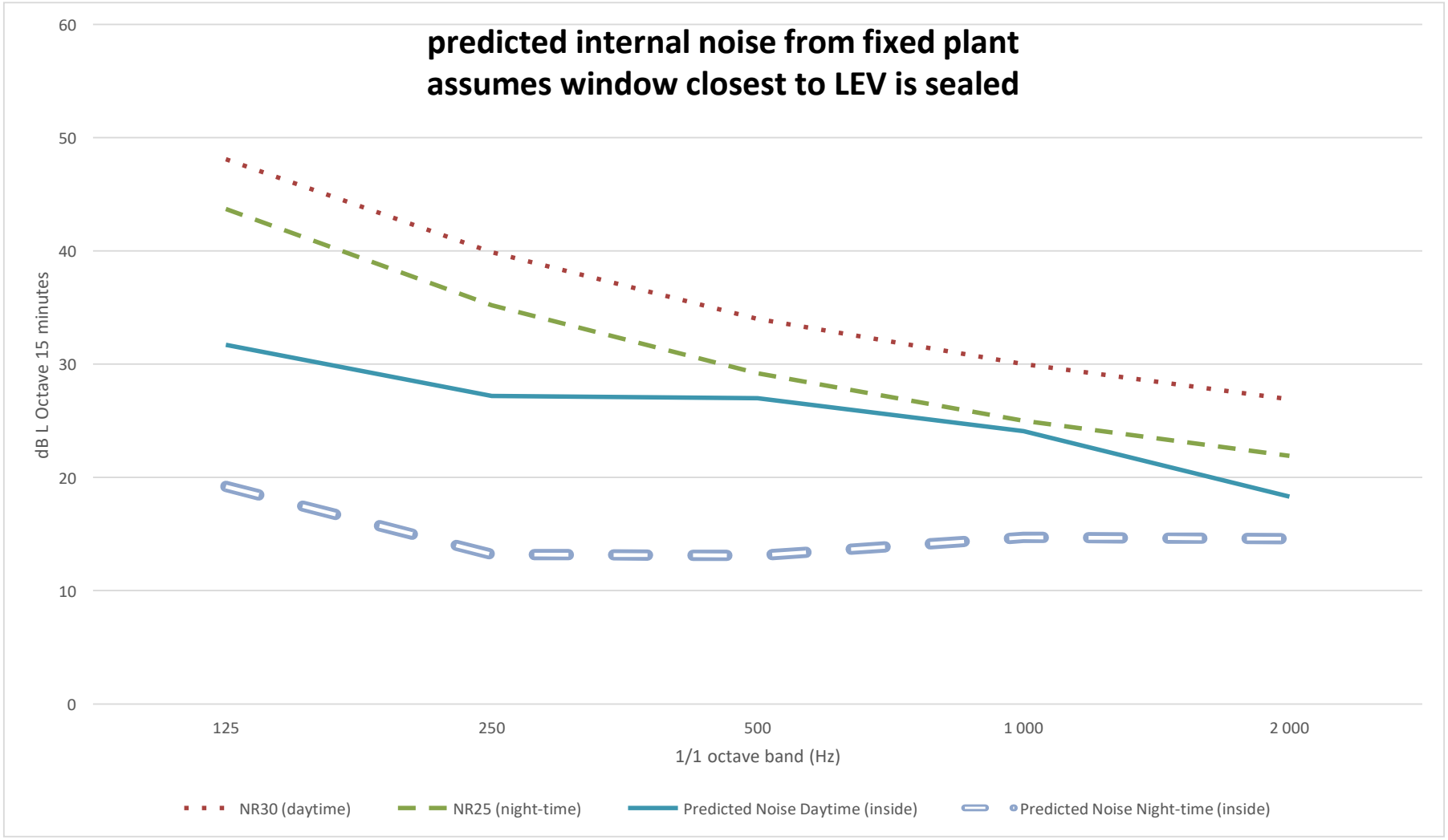

attenuation provided by floor (no adjustment for ambient background or RT)
difference - dB
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
Series1
Series2
Series3
Series4
Series5
Series6
Series7
Series8
Series9
Series10
Series11
Series12
average


attenuation provided by floor
(with RT adhustement and no adjustment for ambient background)
difference - dB
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
adjusted for RT

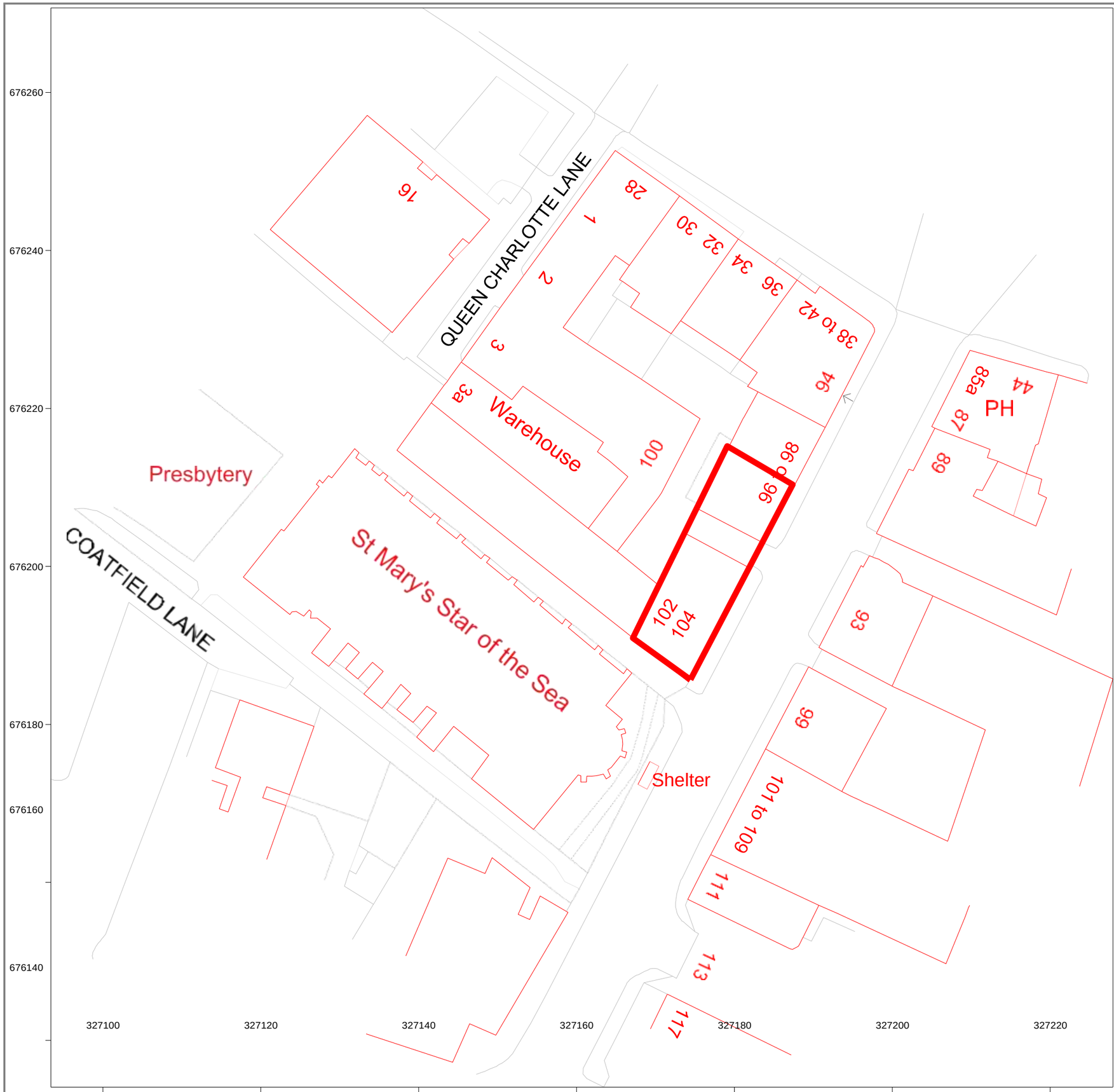

noise from heat exchanger
dB Leq 10 minutes
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
Heat Exchanger - Active Window Closed
Heat Exchanger - Active Window Open
Heat exchanger at source


Noise from kitchen LEV
dB Leq 10 minutes
90
80
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
LEV - at source
LEV - Window Closed
LEV - Window Open


measured internal noise from fixed plant
dB L Octave 15 minutes
80
70
60
50
40
30
20
10
0
31.5
63
125
250
500
1 000
2000
4000
8000
1/1 octave band (Hz)
NR25
LEV inside (open window)
heat exchanger (open window)
background
kitchen door


predicted internal noise from fixed plant
assumes window closest to LEV is sealed
60
50
40
30
20
10
0
dB L Octave 15 minutes
125
250
500
1 000
2 000
1/1 octave band (Hz)
NR30 (daytime)
NR25 (night-time)
Predicted Noise Daytime (inside)
Predicted Noise Night-time (inside)

Figures



AS 0792 Constitution Street : 09 November 2020 : Crown copyright Ordnance Survey 0100031673

Site Location

indicative site location

Figure 1

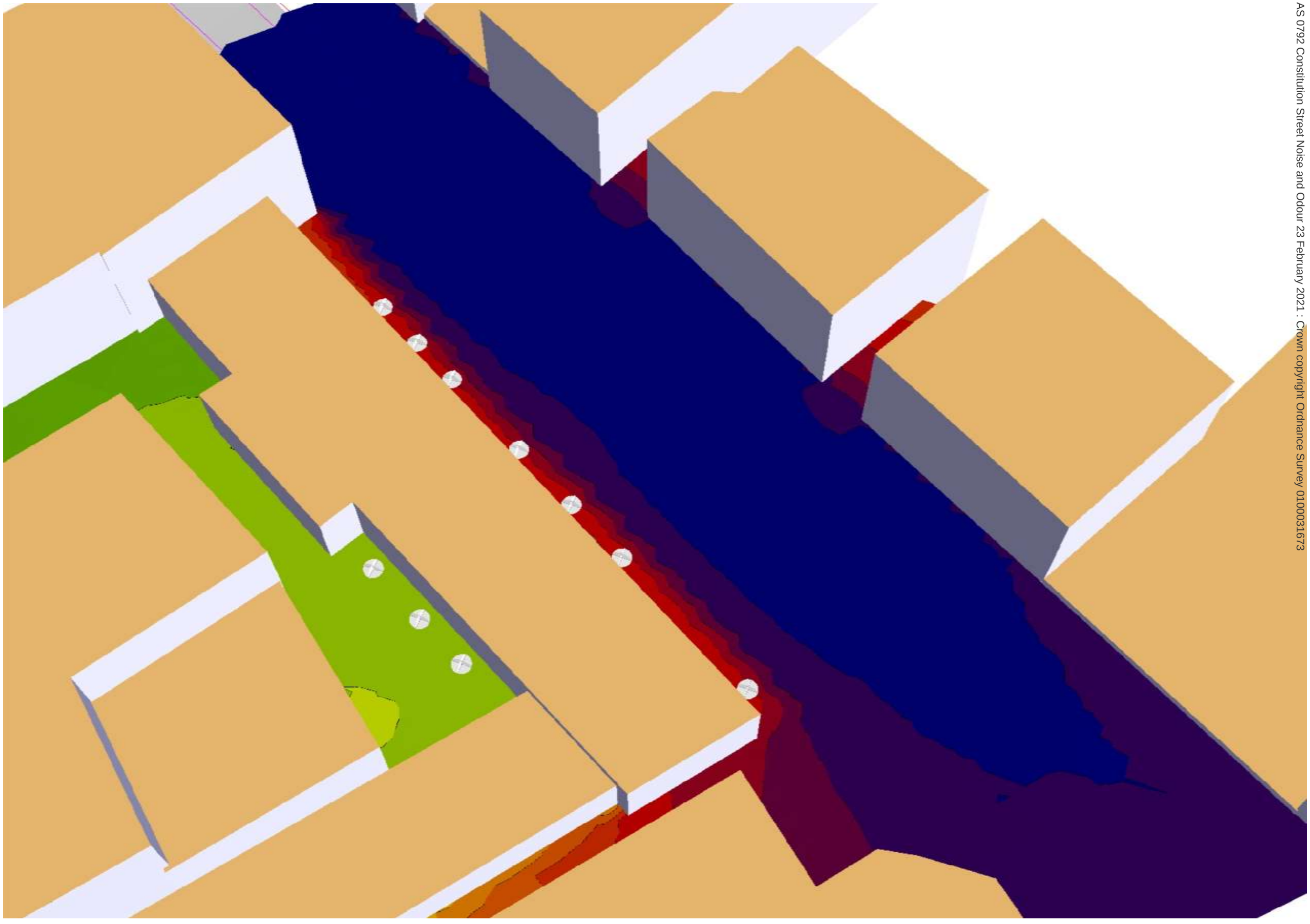
The Airshed

AS 0792 Constitution Street : 18 November 2020 : Crown copyright Ordnance Survey 0100031673

Model Layout

Figure 2

The Airshed

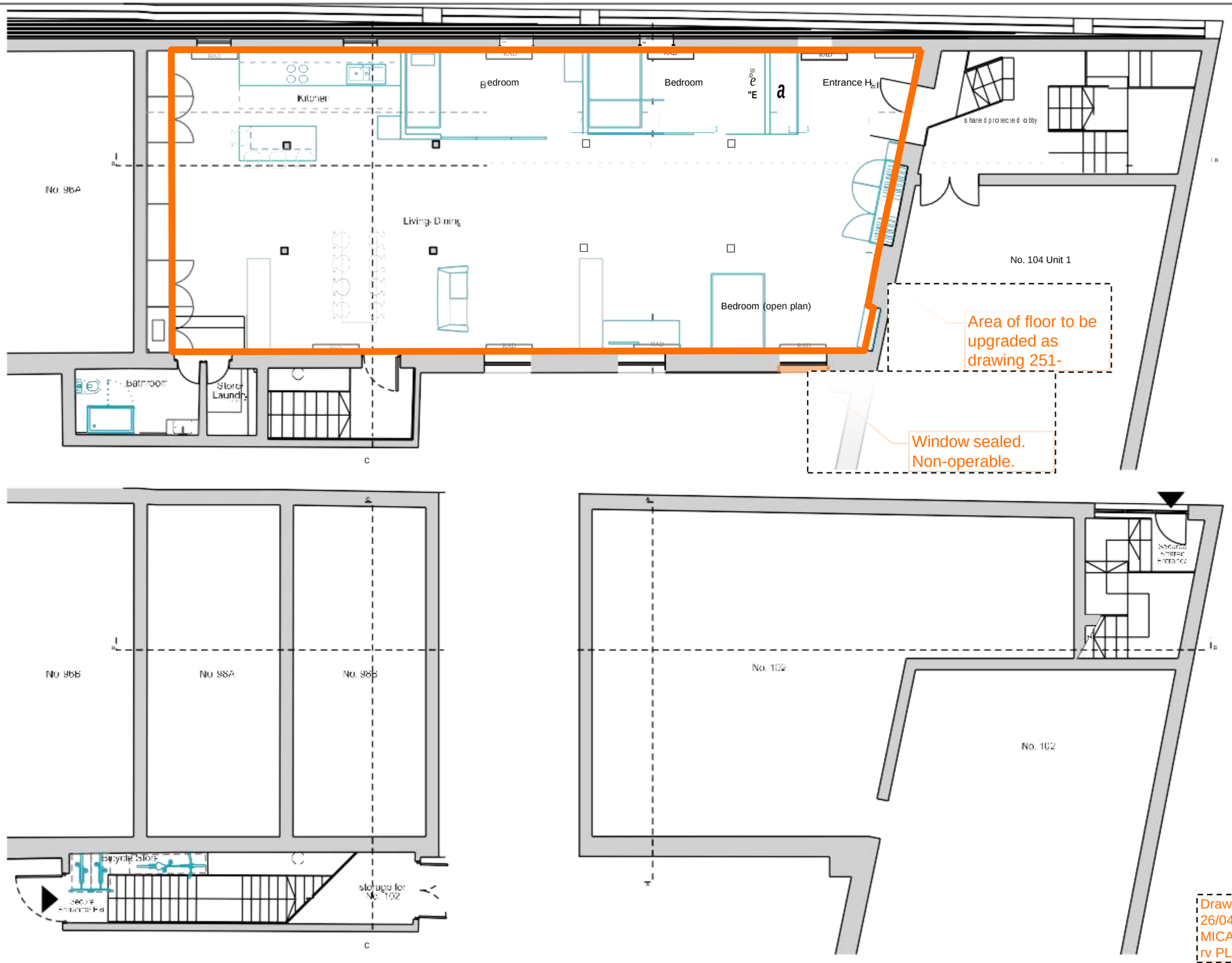


Scenario 2

Figure 3

The Airshed

Appendix 1 – Project Description



First Floor Plan

02	251-19200

Ground Floor Plan

01	251-19200

Drawing Mark-up
26/04/2021
MICA Architects
rv PL2

DO NOT SCALE FROM THIS DRAWING. CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE.
ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

PLANNING

☐ Proposed
☐ Existing

REV	DATE	DESCRIPTION
P1	04.12.20	FOR INFORMATION

0 1 2 3 4 5m

HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

MICA

Ground & First Floor Plans
PROPOSED

251-MICA-PL- 00-DR-A-19200 PL1

1:100 A3 04112120

DO NOT SCALE FROM THIS DRAWING. CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE.
ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

PLANNING

☐ Proposed
☐ Existing

REV	DATE	DESCRIPTION
P1	04.12.20	FOR INFORMATION

0 1 2 3 4 5m

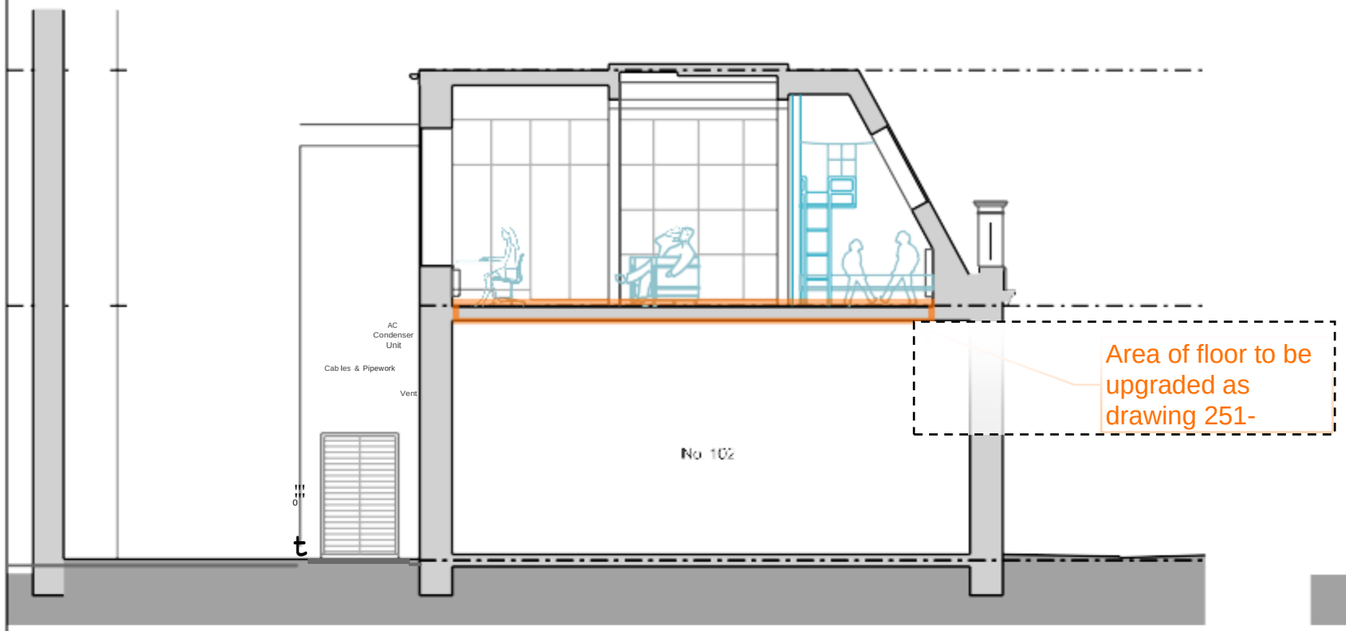
HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

MICA

Roof Plan
PROPOSED

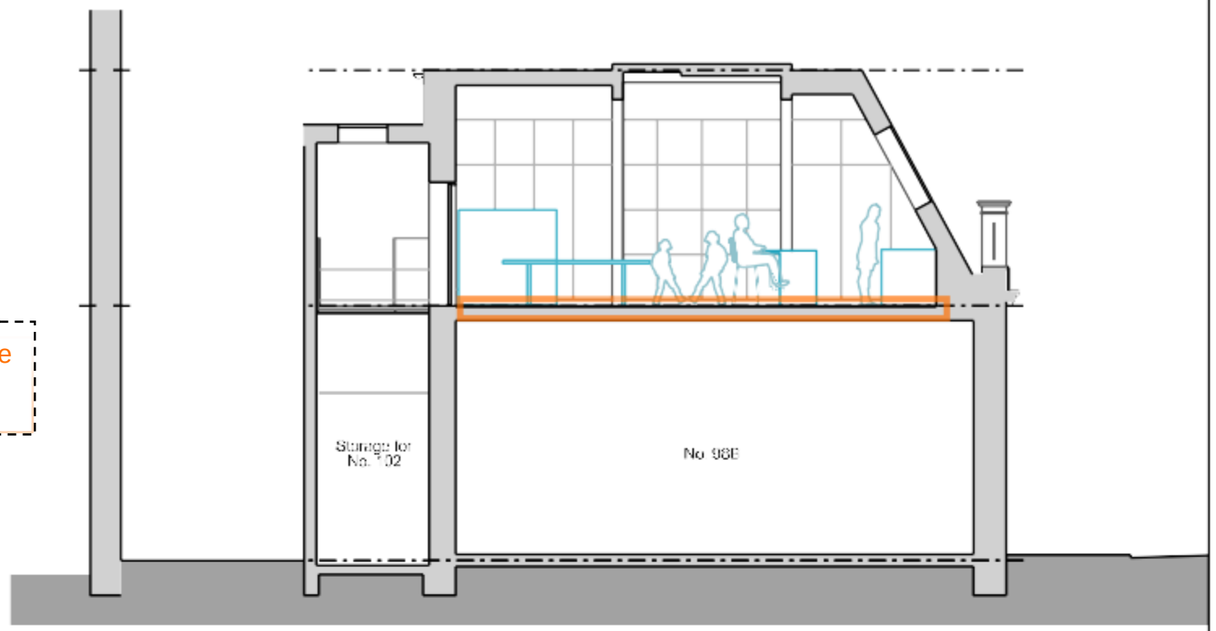
251-MICA-PL- 00-DR-A-19201 PL1

1:100 A3 04112120



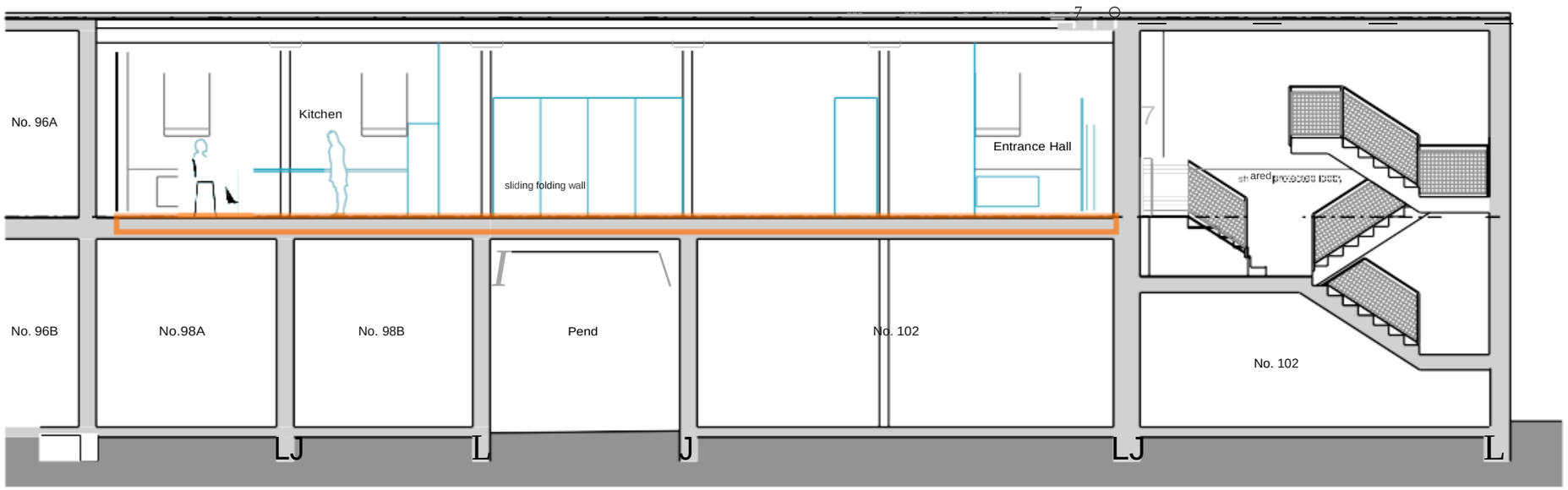
Section AA

01	251-19210



Section CC

03	251-19210



Section BB

02	251-19210

Drawing Mark-up
26/04/2021
MICA Architects
rv PL2

PLANNING

Proposed
Existing

REV	DATE	DESCRIPTION
PL	04.12.20	PLANNING

0 1 2 3 4 5m

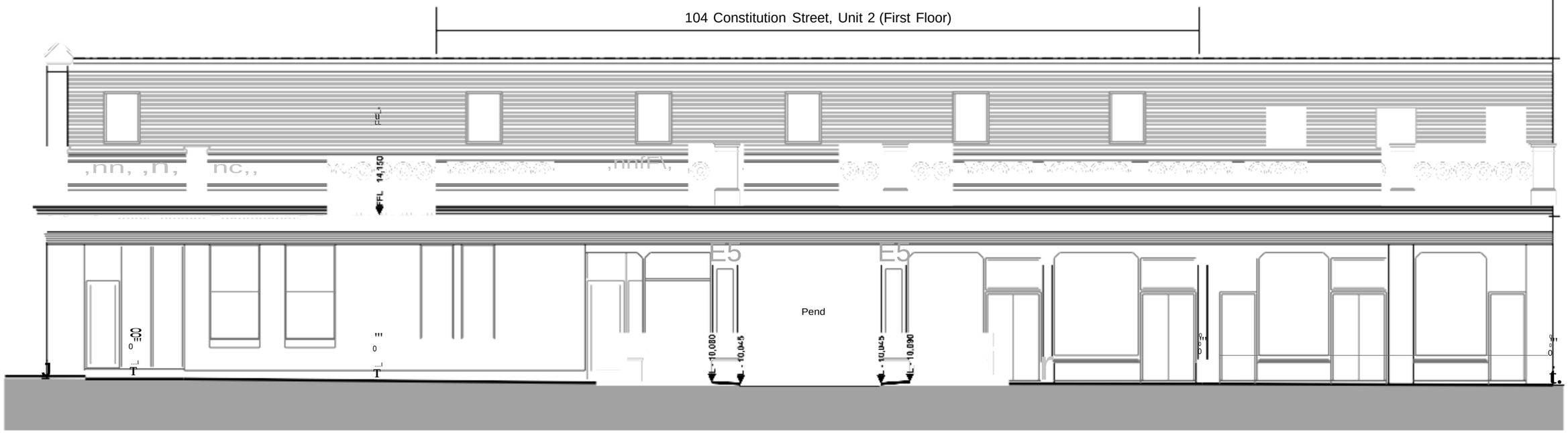
HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

MICA

Section A-A, B-B, & C-C
PROPOSED

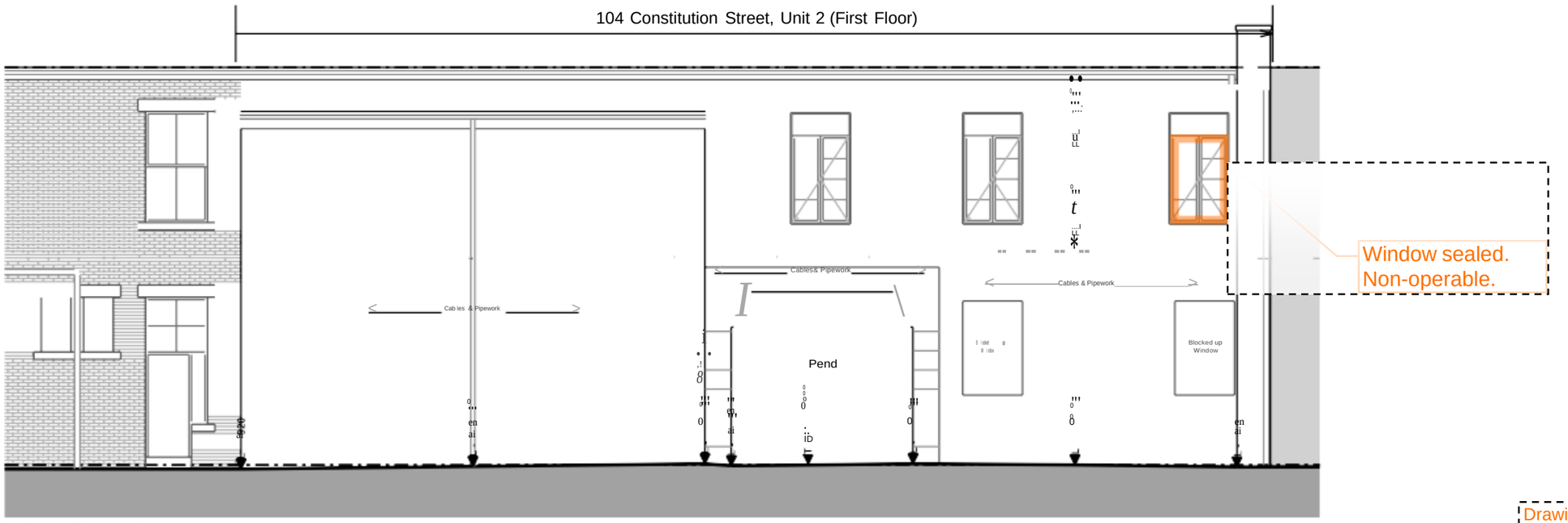
251-MICA-PL- 00-DR-A-19210 PL1

1:100 | A3 | 04112120



East Elevation

01	251-19220



West Elevation

02	251-19220

Drawing Mark-up
26/04/2021
MICA Architects
rv PL2

PLANNING

☒ Proposed
☐ Existing

REV	DATE	DESCRIPTION
PL1	04.12.20	PLANNING

0 1 2 3 4 5m

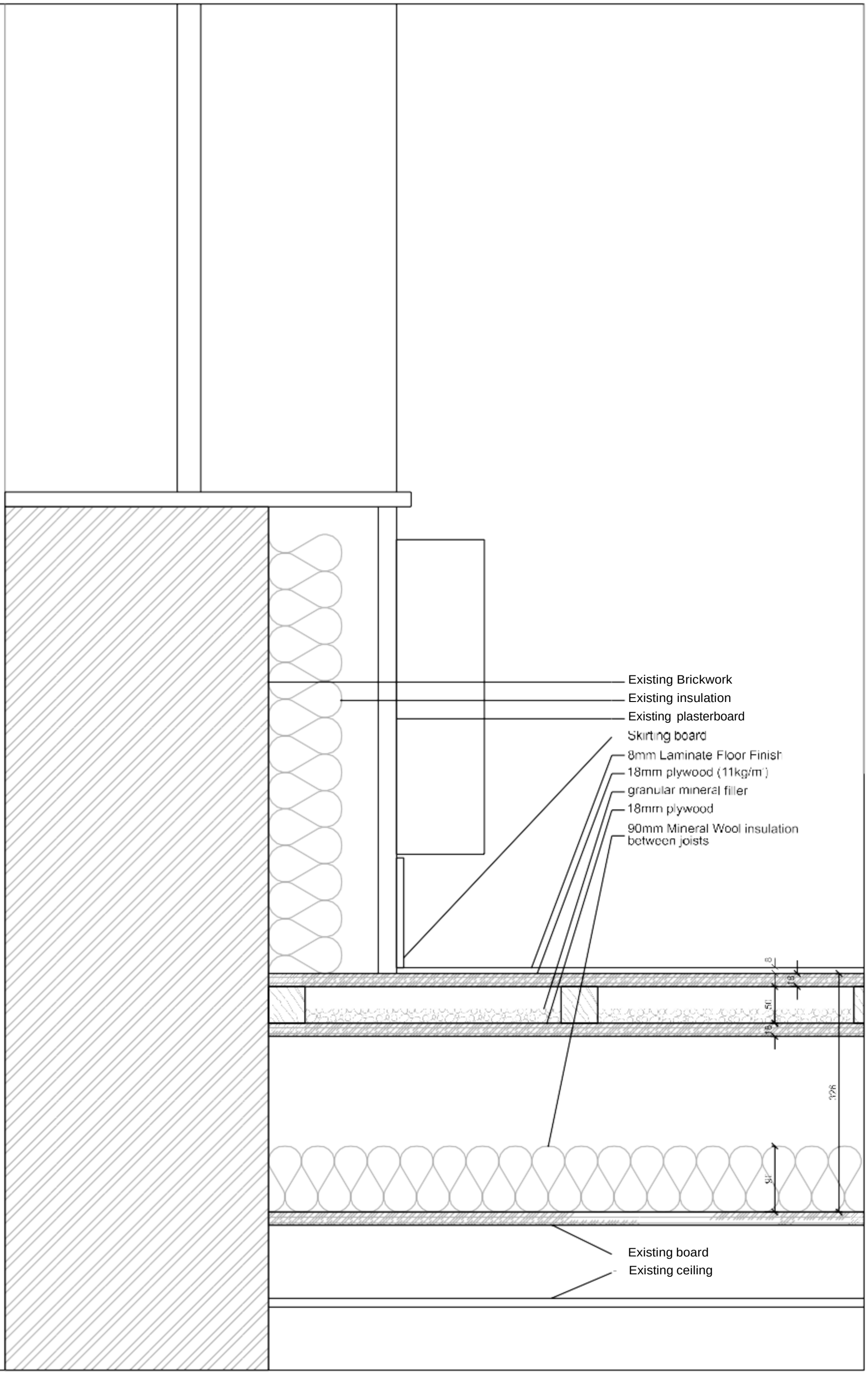
HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

MICA

East & West Elevations
PROPOSED

251-MICA-PL- 00-DR-A-19220 PL1

1:100 | A3 | 04112120



PRELIMINARY

REV	DATE	DESCRIPTION
PL126.04.21		PLANNING

HOGARTH LOFT
104 CONSTITUTION STREET, EH6 6AW

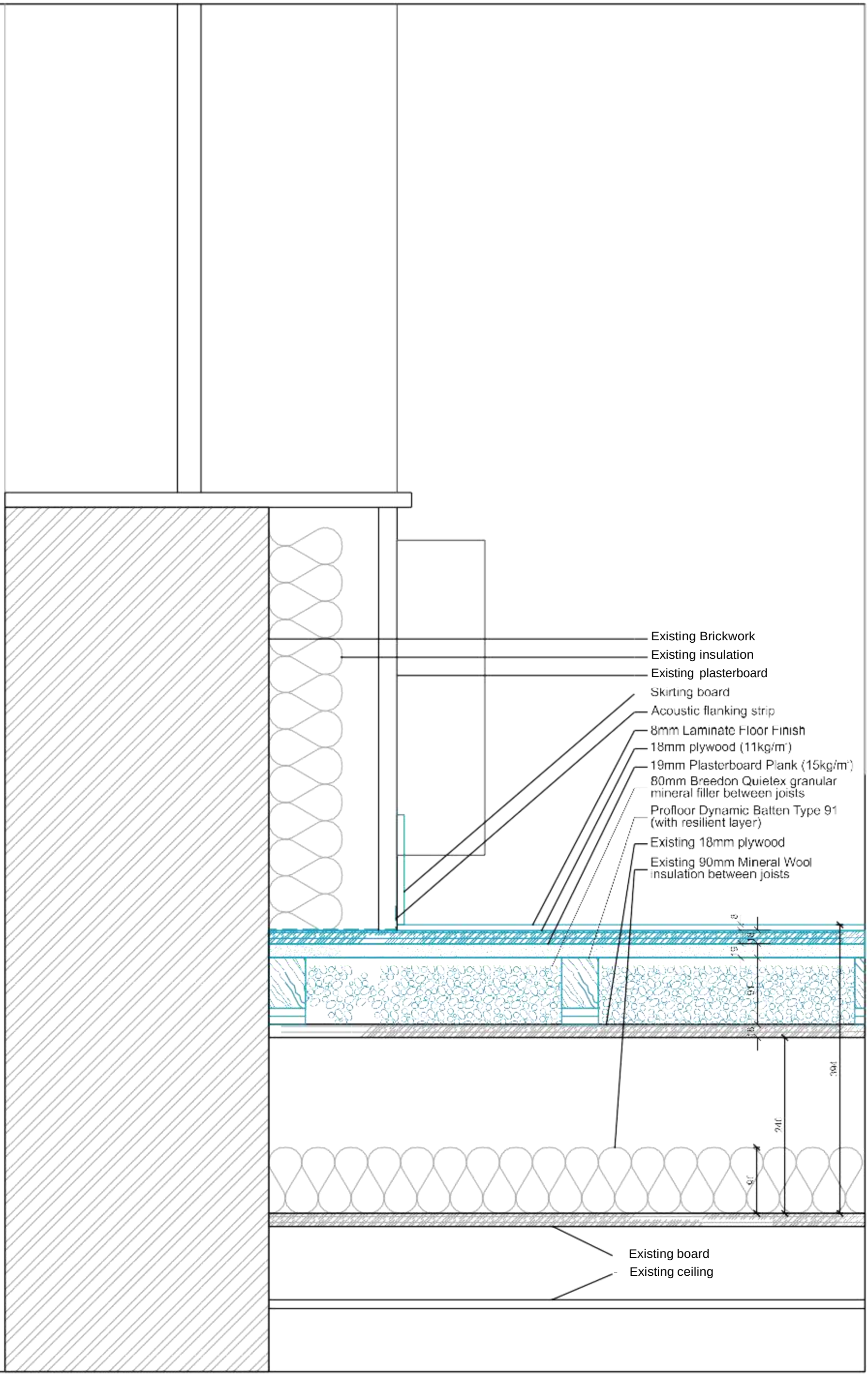
EXISTING EXTERNAL SECTION DETAIL
Wall and Floor

251-MICA-XX- 01-DR-A-41000 PL1

MICA
123 Camden High Street London NW1 7JR
T: 020 7284 1727 F: 020 7267 7826
info@micaarchitects.com www.micaarchitects.com

1:5 | ''' A3 | ! 25104121

41001



PRELIMINARY

REV	DATE	DESCRIPTION
PL1	26.04.21	PLANNING

HOGARTH LOFT
104 CONSTITUTION STREET, EH6 6AW

PROPOSED EXTERNAL SECTION DETAIL
Wall and Floor

MICA
123 Camden High Street London NW1 7JR
T: 020 7284 1727 F: 020 7267 7826
info@micaarchitects.com www.micaarchitects.com

251-MICA-XX-01-DR-A-41001 PL1

1:5 | A3 | 25104121

Appendix 2.1 – Baseline Survey at Apartment

Noise Survey

Project Number: AS 0792 **Project Name:** Constitution Street, Restaurant
Log Book Number: 113

Start Date/Time: Thursday 18th Febraury 2021, 17:00

Site:	Temperature (Celsius)	Cloud Cover (Oktas)	Wind Speed (m/s)	Wind Direction	Sound Level Meter
Roof Measurements	8	4	1	SE	6
Outdoor Rear	7	Dark Overcast	0	-	6
Indoor Measurments (1st Floor)	-	-	-	-	5
Indoor Measurments (Ground Floor)	-	-	-	-	6

Norsonic Nor-140 Sound Level Meter 5	Serial No.	1406913
Norsonic Nor-1251 Acoustic Calibrator B	Serial No.	34961
Norsonic Nor-1225 Microphone	Serial No.	208201
Norsonic Nor-1217 Outdoor Protection Kit	Serial No.	12175402
Calibration Factor 113.8	Calibration End:	113.8
Norsonic Nor-140 Sound Level Meter 6	Serial No.	1406914
Norsonic Nor-1251 Acoustic Calibrator B	Serial No.	34961
Norsonic Nor-1225 Microphone	Serial No.	212990
Norsonic Nor-1217 Outdoor Protection Kit	Serial No.	12175403
Calibration Factor 113.8	Calibration End:	113.8


Measurement at Extraction Vent - LEV


Heat Exchanger


Measurement at Active Window - LEV


Measurement at Kitchen Door

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, CM6 1HD, England
www.campbell-associates.co.uk
info@campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

CALIBRATION

0789

Certificate number: U34600

Certificate of Calibration and Conformance

Test object:	**Sound Calibrator**
Manufacturer:	**Norsonic**
Type:	**1251**
Serial no:	**34961**
Customer:	The Airshed Ltd
Address:	5 Lauder Place, East Linton. EH40 3DB.
Contact Person:	Hilary Fraser.

Measurement Results:	Level	Level tabilif/	Frequency	Frequency Stability	Distortion
1:	114.17 dB	0.05 dB	1000.'66 Hz	0.00 %	0.35%
2:	114.18 dB	0.05 dB	1000.67 Hz	0.00 %	0.35%
3:	114.18 d8	0.05 dB	1000.67 Hz	0.00 %	0.34%
Result (Average):	**114.18 dB**	**0.05 dB**	**1000.66 Hz**	**0.00 %**	**0.35 %**
Expanded Uncertainty:	0.10 dB	0.02 dB	1.00 Hz	0.01 %	0.10 %
Degree of Freedom:	>100	>100	>100	>100	>100
Coverage Factor:	2.00	2.00	2.00	2.00	2.00

The stated level is relative to.20µPa. The level is traceable to National Standards.
The stated level is valid at reference conditions. The following correction factors have been applied during the measurement: Pressure: 0.0005 dB/kPa Temperature: 0.003 dB/°C Relative humidity: 0.000 dB/o/oRH Load volume : 0.0003 d8/mm3
The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freeqom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.
Records: K:\C A\Calibration\Nor-1504\Nor-1018CalCal\2020\NOR1251_34961_M1.nmf

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50%RH
Measurement conditions:	101.219 ± 0.042 kPa	22.9 ± 0.1 °C	34.1 ± 1.6 %RH

Date received for calibration:	16/04/2020
Date of calibration:	17/04/2020
Date of issue:	17/04/2020
Engineer	[redacted]
	Michael Tickner
Supervisor	[redacted]
	Darren Batten TechIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceablity of measurement to recognised national standards, and to the units of measurement realised at an accredited national physical laboratory or other recognised standards laboratories. This certificate may not be reproduced other than in full without the prior written approval of the issuing laboratory.

Template UKAS_PE v2.10 DocR Cert-C0001

Certificate number: U34600

Preconditioning
The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Measurements
The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; 83.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Method
Calibration has been performed as set out in the current version of CA Technical procedure TP01

Instruments and program
A complete list of equipmen,t hardware and software that has been used in this calibration is available from the calibration laboratory on request.

Traceability
The measured values are traceable to an accredited national physical laboratory within the EU or EFTA

Comment
Calibrated as received, no adjustments made.

Statement of conformance

As public evidence was available\ from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of that BS EN IEC 60942:2003.

' This evidence is held on file at the calibration laboratory.

Notes:
The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in **BOLD** are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Sonitus House. 5b Chelmsford Road Industrial Estate, Great Dunmow, GB-CM6 1HD
Tel (+44) 01371 871030 Fax (+44) 01371 879106
email calibration@campbell-associates.co.uk

Campbell Associates Ltd
Sb Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
www.campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

CALIBRATION

0789

Certificate of Calibration and Conformance

Certificate number: U31946

Test object:	**Sound Level Meter, BS EN IEC 61672-1:2003 Class 1 (Precision)**
Producer :	**Norsonic**
Type:	**140**
Serial No.:	**1406913**
Customer:	**The Airshed Ltd**
Address:	**5 Lauder Place,**
	East Linton. EH40 3D8 .
Contact Person:	**Hilary Fraser.**

Method :
Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. These are based on the procedures for periodic verification of sound level meters as set out in BS EN IEC 61672-3:2006. Results and conformance statement are overleaf and detailed results are in the attached Test Report.

Tested

	Producer:	Type:	Serial No:	Certificate number
Microphone	Norsonic	1225	208201	31945
Calibrator*	Norsonic	1251	30873	U30563
Preamplifier	Norsonic	1209	21061	Included

Additional items that also have been submitted for verification
Wind shield
Attenuator
Extension cable
These items have been taken into account wherever appropriate

Instruction manual: lm140_1Ed6R3En Firmware version: 4.0.1282 The test object is a single channel instrument.

Conditions	Pressure	Temperature	Humidity
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	101.34 ±0.05 kPa	22.0 ±0.2 °C	47.0 ±0.7 %RH

Date received for calibration: 22/05/2019
Date of calibration: 30/05/2019
Date of issue: 30/05/2019
Engineer [redacted]

Supervisor Michael Tickner [redacted]
Darren Batten TechIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology Institutes. Thiscertificate *may* not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

- The calibrator wascomplete with any required coupler for the microphone specified.

Certificate of Calibration and Conformance

UKAS Laboratory Number 0789

Certificate number: U31946

Conformance

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to BS EN IEC 61672-1:2002 and similarly that the associated sound calibrator conforms to BS EN IEC 60942.

Statement of conformance

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of BS EN IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available[1], from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in **accordance with BS EN** IEC **61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements** in **BS EN IEC 61672-1:2002, and that the sound level meter submitted for testing conforms** to **the class 1 requirements of BS EN IEC 61672-1:2003.**

[1] This evidence is held on file at the calibration laboratory

Summary of Measurement Results

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9	Passed
Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14	Passed
Toneburst response - IEC 61672-3 Ed.1 Clause 16	Passed
Peak C sound level- IEC 61672-3 Ed.1 Clause 17	Passed
Overload indication - IEC 61672-3 Ed.1 Clause 18	Passed

Comment

Correct level with associated calibrator is 113.9dB(A).

Observations

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9

Reference level: 114.0 dB
Reference Range: 130 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator: WSC5 - Norl251-31824
Reference calibrator level: 113.99
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.84
Calibrator level before adjustment: 113.8
After calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.84
Reference calibrator level after calibration: 113.8
Associated Calibrator: Norsonic - 1251 - 30873
Associated calibrator level: 114.07
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.92
Indicated level: 113.9
Final level statement:
Environmental corrections after calibration: 0.00
Other corrections: -0.15
Notional level: 113.92
Calibrator level after adjustment: 113.9
This value shall be used for adjusting the sound level meter in the future.
Test Passed

Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2

Network	Level (dB)	Comment
A	15.4	Microphone installed
A	9.9	Equivalent capacity
C	11.9	Equivalent capacity
Z	19.5	Equivalent capacity

Test Passed

Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11

c-weighted results

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
125 Hz	0.2	0.2	0.0	0.1	0.0	0.1			0.2	+-1.5	0.2	p
1 kHz	0.0	0.2	0.1	0.1	-0.1	0.1			0.3	+-1.1	0.0	p
4 kHz	-1.2	0.2	1.1	0.2	0.0	0.2			0.3	+-1.6	-0.1	p
8 kHz	-3.3	0.2	3.4	0.2	0.0	0.2			0.4	+2.1/-3.1	0.1	p

The level obtained at 1 kHz was used as reference for the calculations.
This level was: 91.80 dB.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
Frequency response test using electrostatic actuator.
Sources for correction data:

Microphone field corrections and uncertainty:	Norsonic AS
Case reflections and uncertainty:	Norsonic Cert. CAL022-20ll-2849
Wind screen corrections and uncertainty:	

Test Passed

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

A-Weighted results:

Frequency	SLM Meas (dB)	SLM u (dB)	Microphone Corr (dB)	Microphone u (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	p
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	p
250 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.4	0.0	p
500 Hz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.4	0.1	p
1 kHz	0.0	0.1	0.0	0.1	-0.1	0.1			0.19	+-1.1	-0.1	p
2 kHz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.6	0.1	p
4 kHz	-0.1	0.1	-0.1	0.2	0.0	0.2			0.31	+-1.6	-0.2	p
8 kHz	0.0	0.1	0.1	0.2	0.0	0.2			0.31	2.1/3.1	0.1	p
16 kHz	0.0	0.1	0.8	0.3	-0.1	0.3			0.44	3.5/17	0.7	p

c-weighted results:

Frequency	SLM Meas (dB)	SLM u (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. corr (dB)	Case Refl. u (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	p
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	p
250 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.4	0.0	p
500 Hz	0.1	0.1	0.0	0.1	0.1	0.1			0.19	+-1.4	0.2	p
1 kHz	0.0	0.1	0.0	0.1	-0.1	0.1			0.19	+-1.1	-0.1	p
2 kHz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.6	0.1	P
4 kHz	-0.1	0.1	-0.1	0.2	0.0	0.2			0.31	+-1.6	-0.2	P
8 kHz	0.0	0.1	0.1	0.2	0.0	0.2			0.31	2.1/3.1	0.1	P
16 kHz	0.0	0.1	0.8	0.3	-0.1	0.3			0.44	3.5/17	0.7	P

Z-Weighted results:

Frequency	SLM Meas (dB)	SLM u (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. u (dB)	Wind screen Corr (dB)	Wind screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

63 Hz	0.0	0.1	0.0	0.1	0.0	0.1	0.19	+-1.5	0.0	p
125 Hz	-0.1	0.1	0.0	0.1	0.0	0.1	0.19	+-1.5	-0.1	p
250 Hz	-0.1	0.1	0.0	0.1	0.0	0.1	0.19	+-1.4	-0.1	p
500 Hz	-0.1	0.1	0.0	0.1	0.1	0.1	0.19	+-1.4	0.0	p
1 kHz	-0.1	0.1	0.0	0.1	-0.1	0.1	0.19	+-1.1	-0.2	p
2 kHz	-0.1	0.1	0.0	0.1	0.1	0.1	0.19	+-1.6	0.0	p
4 kHz	-0.1	0.1	-0.1	0.2	0.0	0.2	0.31	+-1.6	-0.2	p
8 kHz	-0.1	0.1	0.1	0.2	0.0	0.2	0.31	2.1/3.1	0.0	p
16 kHz	-0.1	0.1	0.8	0.3	-0.1	0.3	0.44	3.5/17	0.6	p

The actual frequency response of Norsonic I 1225 208201 has been used for the calculations.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
The calculated uncertainties are checked against the requirements in the standard.
Sources for correction data:

Microphone response and uncertainty:	Measured response/ Settings fil
Case reflections and uncertainty:	Norsonic Cert. CAL022-2011-2849

Test Passed

Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB}	uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.1	0.12	0.1
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	91.9	0.12	-0.1
251.2	92.0	91.9	0.12	-0.1
501.2	92.0	91.9	0.12	-0.1
1000.0	92.0	91.9	0.12	-0.1
1995.3	92.0	91.9	0.12	-0.1
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	91.9	0.12	-0.1
15848.9	92.0	91.9	0.12	-0.1

Test Passed

Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13

Weightings Time	Netw	Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Fast	A	114.0	114.0	0.4	-0.4	0.12	0.0	p
Fast	C	114.0	114.0	0.4	-0.4	0.12	0.0	p
Fast	Z	114.0	114.0	0.4	-0.4	0.12	0.0	p
Slow	A	114.0	113.9	0.3	-0.3	0.12	-0.1	p
Leq	A	114.0	114.0	0.3	-0.3	0.12	0.0	p
SEL	A	124.0	124.0	0.3	-0.3	0.12	0.0	p

Test Passed

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Measured at 8 kHz						
114.0	114.0	1.1	-1.1	0.12	0.0	p
119.0	119.0	1.1	-1.1	0.12	0.0	p
124.0	124.0	1.1	-1.1	0.12	0.0	p
129.0	129.0	1.1	-1.1	0.12	0.0	p
131.0	131.0	1.1	-1.1	0.12	0.0	p
132.0	132.0	1.1	-1.1	0.12	0.0	p
133.0	133.0	1.1	-1.1	0.12	0.0	p
134.0	134.0	1.1	-1.1	0.12	0.0	p
135.0	135.0	1.1	-1.1	0.12	0.0	p
136.0	136.0	1.1	-1.1	0.12	0.0	p
114.0	114.0	1.1	-1.1	0.12	0.0	p
109.0	109.0	1.1	-1.1	0.12	0.0	p
104.0	104.0	1.1	-1.1	0.12	0.0	p
99.0	99.0	1.1	-1.1	0.12	0.0	p
94.0	94.0	1.1	-1.1	0.12	0.0	p
89.0	89.0	1.1	-1.1	0.12	0.0	p
84.0	84.0	1.1	-1.1	0.12	0.0	p
79.0	79.0	1.1	-1.1	0.12	0.0	p
74.0	74.0	1.1	-1.1	0.12	0.0	p
69.0	69.0	1.1	-1.1	0.12	0.0	p
64.0	64.0	1.1	-1.1	0.12	0.0	p

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. {dB)	(dB)	uncert. (dB)	Dev. (dB)	Resı lt
59.0	59.0	1.1	-1.1	0.12	0.0	p
54.0	54.0	1.1	-1.1	0.12	0.0	p
49.0	49.0	1.1	-1.1	0.12	0.0	p
44.0	44.0	1.1	-1.1	0.12	0.0	p
39.0	39.0	1.1	-1.1	0.12	0.0	p
34.0	34.0	1.1	-1.1	0.12	0.0	p
30.0	30.0	1.1	-1.1	0.12	0.0	p
29.0	29.1	1.1	-1.1	0.12	0.1	p
28.0	28.1	1.1	-1.1	0.12	0.1	p
27.0	27.1	1.1	-1.1	0.12	0.1	p
26.0	26.2	1.1	-1.1	0.12	0.2	p
25.0	25.2	1.1	-1.1	0.12	0.2	p
24.0	24.2	1.1	-1.1	0.12	0.2	p

Test Passed

Toneburst response - IEC 61672-3 Ed.1 Clause 16

Burst type	Ref. {dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Fast 200 mSec	134.0	133.9	0.8	-0.8	0.16	-0.1	p
Fast 2.0 mSec	117.0	116.7	1.3	-1.8	0.16	-0.3	p
Fast 0.25 mSec	108.0	107.5	1.3	-3.3	0.16	-0.5	p
Slow 200 mSec	127.6	127.5	0.8	-0.8	0.16	-0.1	p
Slow 2.0 mSec	108.0	107.8	1.3	-3.3	0.16	-0.2	p
SEL 200 msec	128.0	127.9	0.8	-0.8	0.16	-0.1	p
SEL 2.0 mSec	108.0	107.9	1.3	-1.8	0.16	-0.1	p
SEL 0.25 mSec	99.0	98.4	1.3	-3.3	0.16	-0.6	p

Test Passed

Peak C sound level - IEC 61672-3 Ed.1 Clause 17

Pulse Type	Pulse Freq. (Hz)	Ref. RMS (dB)	Ref. Peak (dB)	Measured Value (dB)	Lim. (+/ -dB)	Uncert. (dB)	Dev. (dB)	Result
1 cycle	8k	126.0	129.4	128.7	2.4	0.2	-0.7	p
Pos 1/2 cycle	500	129.0	131.4	131.3	1.4	0.2	-0.1	p
Neg 1/2 cycle	500	129.0	131.4	131.3	**1.4**	0.2	-0.1	p

Test Passed

Overload indication - IEC 61672-3 Ed.1 Clause 18

	Measured (dB)	Lim. (+/-dB)	Uncert. (dB)	Result
Level difference of positive and negative pulses:	0.0	1.8	0.16	p
Positive 1/2 cycle 4 kHz. Overload occurred at:	138.7			
Negative 1/2 cycle 4 kHz. Overload occurred at:	138.7			

Test Passed

*** End of results***

Calibration Report

Certificate No.:31945

Manufacturer:	Norsonic
Type:	1225
Serial no:	208201

Customer :	**The Airshed Ltd**
Address:	**5 Lauder Place,**
	East Linton. EH40 30B.
Contact Person:	**Hilary Fraser.**

Measurement Results:

	Sensitivity (dB re 1V/Pa)	Capacitance: (pF)
1:	-25.65	22.6
2:	-25.65	22.6
3:	-25.65	22.5
Result (Average):	**-25.65**	**22.5**
Expanded Uncertainty:	0.10	1.00
Degree of Freedom:	>100	>100
Coverage Factor:	2.00	2.00

The following correction factors have been applied during the measuremen:t
Pressure:-0.001 dB/kPa Temperature:-0.005 dB/°C Relative humidity:0.000 dB/%RH

Reference Calibrator: WSCl - Norl253-24269 Volume correction: 0.000 dB
Records:K:\C A\Calibration\Nor-1504\Nor17 MicCal\2019\NOR1225 208201 Ml.runf
Measurement procedure: TP0S
All results quoted are directly traceable to National Physical Laboratory, London

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds co coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA publication EA-4/02.

Comment:

Environmental conditions:

Pressure:	Temperature:	Relative humidity:
101.338±0.041 kPa	21.8±0.1 °C	45.6 ± 1.3 %RH

Date of calibration: 30/05/2019
Date of issue: 30/05/2019

Supervisor : Darren Batten TechlOA
Engineer :

Campbell Associates
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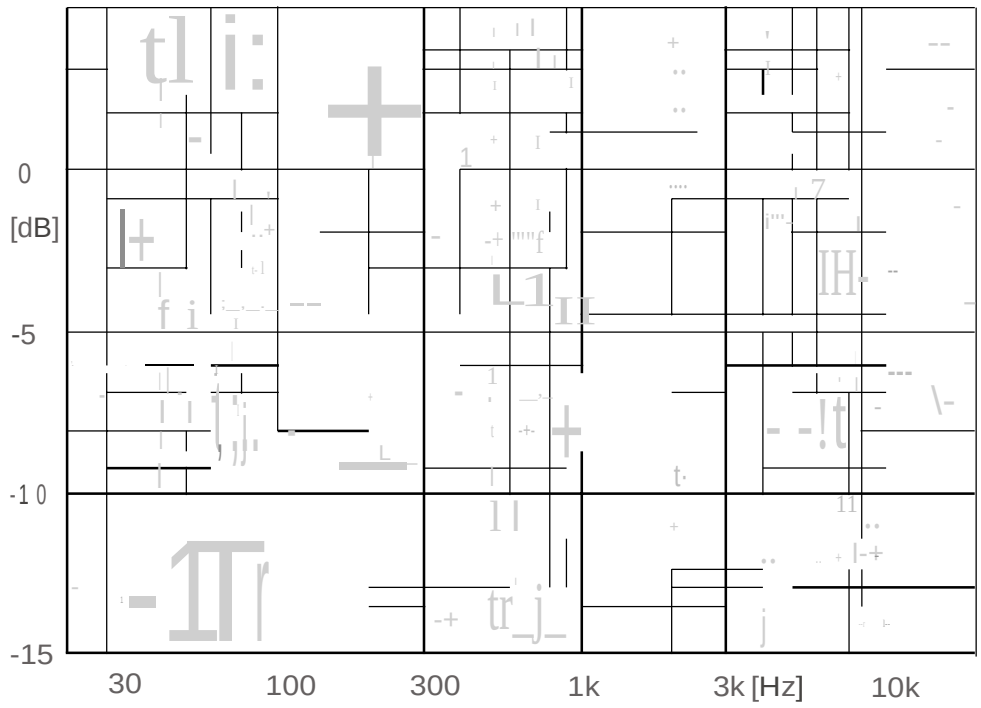
oftware version: 6.0h

Microphone Calibration Certificate



Norsonic
Type: 1225

Serial no: 208201

Sensitivity: 52.17 mV/Pa
-25.65 ±0.10 dB re. 1 V/Pa
Capacitance 22.5 ±1.0 pF
Date: 30/05/2019

Signature:

Measurement conditions:

Pol¥ isation voltage:	200.0 V
Pressure:	101.34 ±0.04 kPa
Temperature:	21.8 ±0.1 •C
Relative humidity:	45.6 ±1.3 %RH

Results are normalized to the reference conditions.

Free field response
Pressure (Actuator) response

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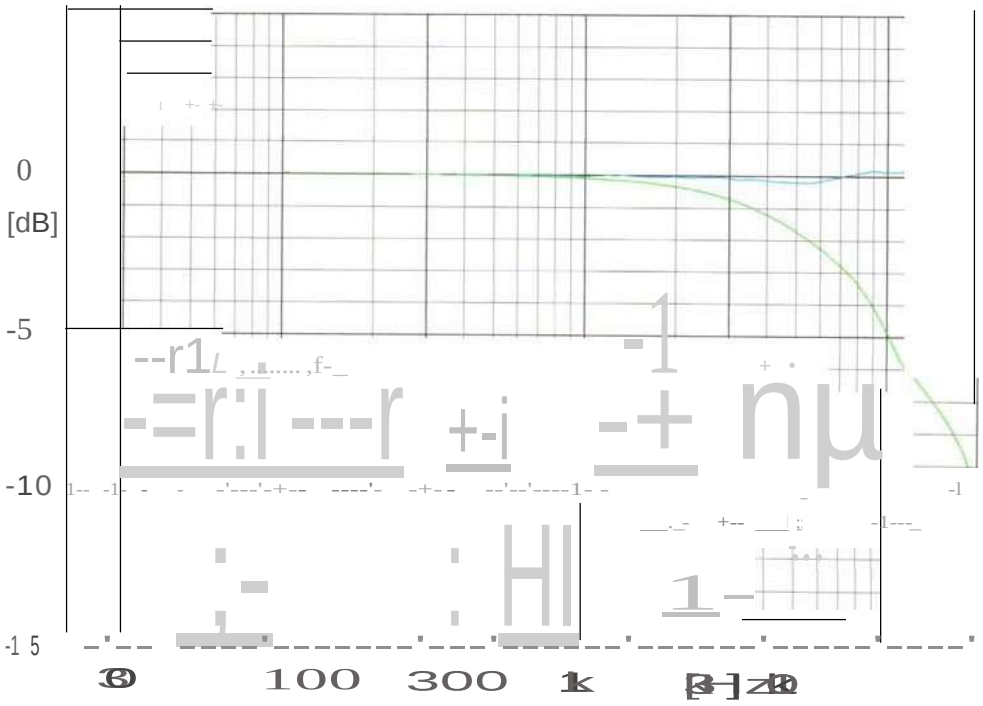
Microphone Calibration Certificate



Norsonic
Type: 1225

Serial no: 208201

Sensitivity: 52.17 mV/Pa
-25.65 ±0.10 dB re. 1 V/Pa
Capacitance 22.5 ±1.0 pF
Date: 30/05/2019

Signature: /4. c. /

Measurement conditions:

Polarisabnvdtage	200.0 V
Pressure:	101.34 ±0.04 kPa
Temperature:	21.8 ±0.1 •C
Relative humidity:	45.6 ±1.3 %RH

Results are normalized to the reference conditions.

Free field response
Pressure (Actuator) response

Campbell Associates

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Comment:

Campbell Associates Ltd
Sb Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
www.campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

CALIBRATION

0789

Certificate of Calibration and Conformance

Certificate number: U32054

Test object:	**Sound Level Meter, BS EN IEC 61672-1:2003 Class 1 (Precision)**
Producer:	**Norsonic**
Type:	**140**
Serial No.:	**1406914**
Customer:	**The Airshed Ltd**
Address:	**5 Lauder Place, East Linton. EH40 JDB.**
Contact Person:	**Hilary Fraser**
Order No:	**1907**

Method :
Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. These are based on the procedures for periodic verification of sound level meters as set out in BS EN IEC 61672-3:2006. Results and conformance statement are overleaf and detailed results are in the attached Test Report.

Tested

	Producer:	Type:	Serial No:	Certificate number
Microphone	Norsonic	1225	212990	32053
Calibrator*	Norsonic	1251	31060	U31713
Preamplifier	Norsonic	1209	21121	Included

Additional items that also have been submitted for verification
Wind shield
Attenuator
Extension cable
These items have been taken into account wherever appropriate.

Instruction manual: Im140_1Ed6R3En Firmware version: v4.0.1282 The test object is a single channel instrument.

Conditions	Pressure	Temperature	Humidity
Reference conditions:	101.325 kPa	23.0 °C	50%RH
Measurement conditions:	99.89 ±0.05 kPa	21.6 ±0.4 °C	45.6 ±0.7 %RH

Date received for calibration: 06/06/2019
Date of calibration: 13/06/2019
Date of issue: 13/06/2019
Engineer

[redacted]
Palanivel Marappan B.Eng (Hons), M.Sc

Supervisor [redacted]
Darren Batten Tech IOA

• Thecalibrator was complete with *any* required coupler for the microphone specified.

Certificate of Calibration and Conformance

UKAS Laboratory Number 0789

Certificate number: U32054

Conformance

From markings on the soundlevel meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to BS EN IEC 61672-1:2002 and similarly that the associated sound calibrator conforms to BS EN IEC 60942.

Statement of conformance

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of BS EN IEC **61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available**[1], **from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with BS EN** IEC **61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in BS EN IEC 61672-1:2002, and that the sound level meter submitted for testing conforms to the class 1 requirements of BS EN IEC 61672-1:2003.**

[1] This evidence is held on file at the calibration laboratory

Summary of Measurement Results

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9	Passed
Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12	Passed
Frequency weightings: A Network- IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14	Passed
Toneburst response - IEC 61672-3 Ed.1 Clause 16	Passed
Peak C sound level - IEC 61672-3 Ed.1 Clause 17	Passed
Overload indication - IEC 61672-3 Ed.1 Clause 18	Passed

Comment

Correct level with associated calibrator is 113.9d8(A).

Observations

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate

Calibration Report

Certificate No.:32053

Manufacturer:	**Norsonic**
Type:	**1225**
Serial no:	**212990**

Customer :	**The Airshed Ltd**
Address:	**5 Lauder Place,**
	East Linton. EH40 3D8.
Order No:	**1907**
Contact Person:	**Hilary Fraser**

Measurement Results:

	Sensitivity: (dB re lV/Pa)	Capacitance (pF)
1:	-25.48	23.1
2:	-25.49	23.0
3:	-25.49	23.1
Result (Average):	**-25.49**	**23.1**
Expanded Uncertainty	0.10	2.01
Degree of Freedom:	>100	>100
Coverage Factor:	2.00	2.00

The following correction factors have been applied during the measuremen:t
Pressure:-0.001 dB/kPa Temperature:-0.005 dB/°C Relative humidity:0.000 dB/%RH

Reference Calibrator: WSCl - Nor125-24269 Volume correction: 0.000 dB
Records K:\C A\Calibration\Nor-1504\Nor-1017 MicCal\2019\NOR1225 212990 Ml.nmf
Measurement procedure: TP0S
All results quoted are directly traceable to National Physical Laboratory, London

The reported expanded uncertainty of measur ment is stated as Lhe standard uncertainty of measurement multiplied by the coverage factor k 2, which for a normal disrribution corresponds to coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance wir-h F.A publication E.A-4/02 .

Comment:

Environmental conditions:

Pressure:	Temperature:	Relat ive hum idity:
99.875 ± 0.042 kPa	21.7 ± 0.1 °C	46.8 ± 1.2 %RH

Date of calibration: 13/06/2019
Date of issue: 13/06/2019

Supervisor : Darren Batten TechlOA
Engineer :

[redacted]

Palanivel Marappan BEng(Hons), MSc
Software version: 6.0h

Campbell Associates
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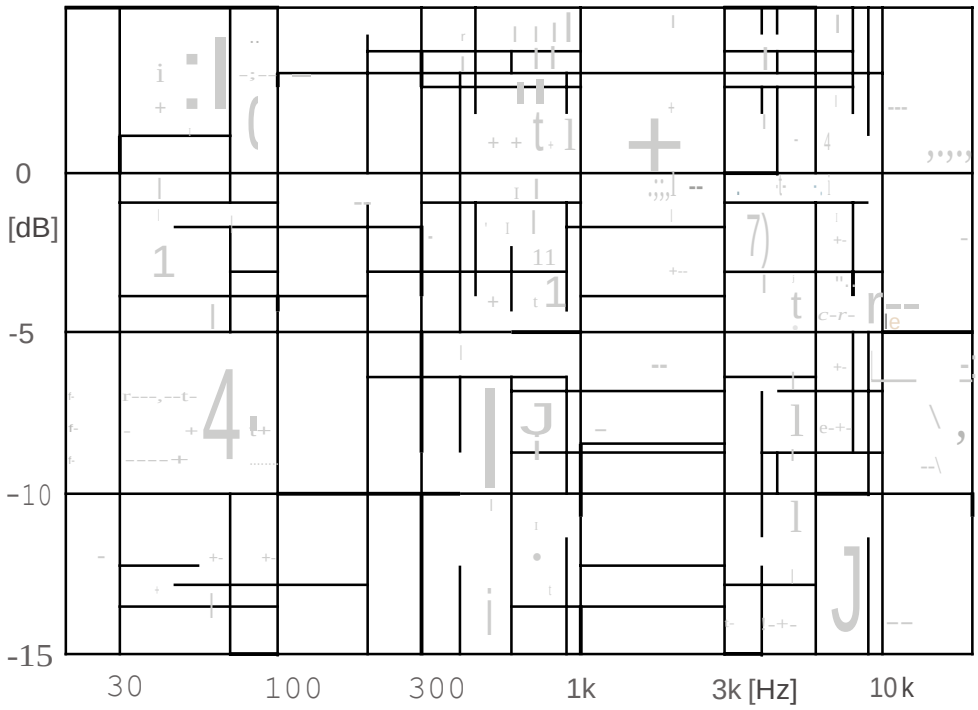
Microphone Calibration Certificate



Norsonic
Type: 1225

Serial no: 212990

Sensitivity: 53.17 mV/Pa
-25.49 ±0.10 dB re. 1 V/Pa
Capacitance 23.1 ±2.0 pF
Date: 13/06/2019

Signature:

Measurement conditions:

Polarisation voltage:	200.0 V
Pressure:	99.88 ±0.04 kPa
Temperature	21.7 ±0.1 °C
Relative humidity:	46.8 ±1.2 %RH

Results are normalized to the reference conditions.

Free field response
Diffuse field response
Pressure (Actuator\ response

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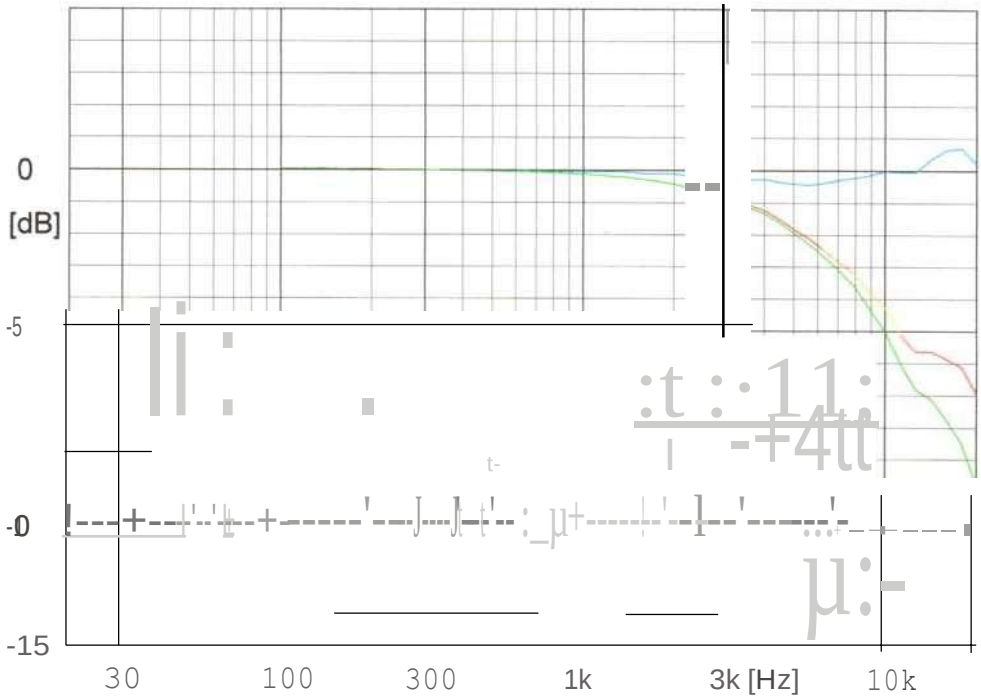
Microphone Calibration Certificate



Norsonic
Type: 1225

Serial no: 212990

Sensitivity: 53.17 mV/Pa
-25.49 ±0.10 dB re. 1 V/Pa
Capacitance 23.1 ±2.0 pF
Date: 13/06/2019

Signature:

Measurement conditions

Polarisation voltage:	200.0 V
Pressure:	99.88 ±0.04 kPa
Temperature	21.7 ±0.1 °C
Relative humidity:	46.8 ±1.2 %RH

Results are normalized to the reference conditions

Free field response
Diffuse field response
Pressure (Actuator) •esponse

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Comment:

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9

Reference level: 114.0 dB
Reference Range: 130 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator : WSC5 - Norl251-31824
Reference calibrator level: 113.99
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.84
Calibrator level before adjustment: 113.8
After calibration:
Environmental corrections: -0.01
Other corrections: -0.15
Notional level: 113.83
Reference calibrator level after calibration: 113.8
Associated Calibrator : Norsonic - 1251 - 31060
Associated calibrator level: 114.06
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.91
Indicated level: 113.9
Final level statement:
Environmental corrections after calibration: -0.01
Other corrections: -0.15
Notional level: 113.90
Calibrator level after adjustment: 113.9
This value shall be used for adjusting the sound level meter in the future.
Test Passed

Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2

Network	Level (dB)	Comment
A	15.7	Microphone installed
A	10.2	Equivalent capacity
C	11.9	Equivalent capacity
Z	20.6	Equivalent capacity

Test Passed

Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11

C-Weighted results

Frequency	SLM Meas (dB)	SLM u (dB)	Microphone Corr (dB)	Microphone u (dB)	Case Refl. Corr (dB)	Case Refl. u (dB)	Wind Screen Corr (dB)	Wind Screen u (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
125 Hz	0.2	0.2	0.0	0.1	0.0	0.1			0.2	+-1.5	0.2	p
1 kHz	0.0	0.3	0.1	0.1	-0.1	0.1			0.3	+-1.1	0.0	p
4 kHz	-1.4	0.3	1.1	0.2	0.0	0.2			0.4	+-1.6	-0.3	p
8 kHz	-3.7	0.3	3.4	0.2	0.0	0.2			0.4	+2.1/-3.1	-0.2	p

The level obtained at 1 kHz was used as reference for the calculations.
This level was: 91.53 dB.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
Frequency response test using electrostatic actuator.
Sources for correction data:
Microphone field corrections and uncertainty: Norsonic AS
Case reflections and uncertainty: Norsonic Cert. CAL022-2011-2849
Wind screen corrections and uncertainty:
Test Passed

Electrical signal tests offrequency weightings - IEC 61672-3 Ed.1 Clause 12

A-Weighted results:

Frequency	SLM Meas (dB)	SLM u (dB)	Microphone Corr (dB)	Microphone u (dB)	Case Refl. Corr (dB)	Case Refl. u (dB)	Wind Screen Corr (dB)	Wind Screen u (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	p
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	p
250 Hz	-0.1	0.1	0.0	0.1	0.0	0.1			0.19	+-1.4	-0.1	p
500 Hz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.4	0.1	p
1 kHz	0.0	0.1	-0.1	0.1	-0.1	0.1			0.19	+-1.1	-0.2	p
2 kHz	-0.1	0.1	-0.1	0.1	0.1	0.1			0.19	+-1.6	-0.1	p
4 kHz	-0.1	0.1	-0.3	0.2	0.0	0.2			0.31	+-1.6	-0.4	p
8 kHz	0.0	0.1	-0.2	0.2	0.0	0.2			0.31	2.1/3.1	-0.2	p
16 kHz	0.0	0.1	0.6	0.3	-0.1	0.3			0.44	3.5/17	0.5	p

C-Weighted results:

Frequency	SLM Meas (dB)	SLM u (dB)	Microphone Corr (dB)	Microphone u (dB)	Case Refl. Corr (dB)	Case Refl. u (dB)	Wind Screen Corr (dB)	Wind Screen u (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	-0.1	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	-0.1	p
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	p
250 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.4	0.0	p
500 Hz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.4	0.1	p
1 kHz	0.0	0.1	-0.1	0.1	-0.1	0.1			0.19	+-1.1	-0.2	p
2 kHz	0.0	0.1	-0.1	0.1	0.1	0.1			0.19	+-1.6	0.0	p
4 kHz	-0.1	0.1	-0.3	0.2	0.0	0.2			0.31	+-1.6	-0.4	p
8 kHz	0.0	0.1	-0.2	0.2	0.0	0.2			0.31	2.1/3.1	-0.2	p
16 kHz	0.0	0.1	0.6	0.3	-0.1	0.3			0.44	3.5/17	0.5	p

Z-Weighted results:

Frequency	SLM Meas (dB)	SLM u (dB)	Microphone Corr (dB)	Microphone u (dB)	Case Refl. Corr (dB)	Case Refl. u (dB)	Wind Screen Corr (dB)	Wind Screen u (dB)	Uncert (dB)	Lim (dB)	Result (dB)

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

63 Hz	-0.1	0.1	0.0	0.1	0.0	0.1	0.19	+-1.5	-0.1	p
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1	0.19	+-1.5	0.0	p
250 Hz	0.0	0.1	0.0	0.1	0.0	0.1	0.19	+-1.4	0.0	p
500 Hz	0.0	0.1	0.0	0.1	0.1	0.1	0.19	+-1.4	0.1	p
1 kHz	0.0	0.1	-0.1	0.1	-0.1	0.1	0.19	+-1.1	-0.2	p
2 kHz	0.0	0.1	-0.1	0.1	0.1	0.1	0.19	+-1.6	0.0	p
4 kHz	0.0	0.1	-0.3	0.2	0.0	0.2	0.31	+-1.6	-0.3	p
8 kHz	0.0	0.1	-0.2	0.2	0.0	0.2	0.31	2.1/3.1	-0.2	p
16 kHz	0.0	0.1	0.6	0.3	-0.1	0.3	0.44	3.5/17	0.5	p

The actual frequency response of Norsonic / 1225 212990 has been used for the calculations.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
The calculated uncertainties are checked against the requirements in the standard.
Sources for correction data:

Microphone response and uncertaint:y	Measured response/ Settings fil
Case reflections and uncertaint:y	Norsonic Cert. CAL022-2011-2849

Test Passed

Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	92.0	0.12	0.0
251.2	92.0	91.9	0.12	-0.1
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	91.9	0.12	-0.1
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	91.9	0.12	-0.1
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	91.9	0.12	-0.1
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	92.0	0.12	0.0
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13

Weightings Time	Netw	Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Fast	A	114.0	114.0	0.4	-0.4	0.12	0.0	p
Fast	C	114.0	114.0	0.4	-0.4	0.12	0.0	p
Fast	Z	114.0	114.0	0.4	-0.4	0.12	0.0	p
Slow	A	114.0	114.0	0.3	-0.3	0.12	0.0	p
Leq	A	114.0	114.0	0.3	-0.3	0.12	0.0	p
SEL	A	124.0	124.0	0.3	-0.3	0.12	0.0	p

Test Passed

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Measured at 8 kHz						
114.0	114.0	1.1	-1.1	0.12	0.0	p
119.0	119.0	1.1	-1.1	0.12	0.0	p
124.0	124.0	1.1	-1.1	0.12	0.0	p
129.0	129.0	1.1	-1.1	0.12	0.0	p
131.0	131.0	1.1	-1.1	0.12	0.0	p
132.0	132.0	1.1	-1.1	0.12	0.0	p
133.0	133.0	1.1	-1.1	0.12	0.0	p
134.0	134.0	1.1	-1.1	0.12	0.0	p
135.0	135.0	1.1	-1.1	0.12	0.0	p
136.0	136.0	1.1	-1.1	0.12	0.0	p
114.0	114.0	1.1	-1.1	0.12	0.0	p
109.0	109.0	1.1	-1.1	0.12	0.0	p
104.0	104.0	1.1	-1.1	0.12	0.0	p
99.0	99.0	1.1	-1.1	0.12	0.0	p
94.0	94.0	1.1	-1.1	0.12	0.0	p
89.0	89.0	1.1	-1.1	0.12	0.0	p
84.0	84.0	1.1	-1.1	0.12	0.0	p
79.0	78.9	1.1	-1.1	0.12	-0.1	p
74.0	73.9	1.1	-1.1	0.12	-0.1	p
69.0	68.9	1.1	-1.1	0.12	-0.1	p
64.0	63.9	1.1	-1.1	0.12	-0.1	p

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
59.0	58.9	1.1	-1.1	0.12	-0.1	p
54.0	53.9	1.1	-1.1	0.12	-0.1	p
49.0	48.9	1.1	-1.1	0.12	-0.1	p
44.0	43.9	1.1	-1.1	0.12	-0.1	p
39.0	38.9	1.1	-1.1	0.12	-0.1	p
34.0	34.0	1.1	-1.1	0.12	0.0	p
30.0	30.0	1.1	-1.1	0.12	0.0	p
29.0	29.0	1.1	-1.1	0.12	0.0	p
28.0	28.1	1.1	-1.1	0.12	0.1	p
27.0	27.1	1.1	-1.1	0.12	0.1	p
26.0	26.2	1.1	-1.1	0.12	0.2	p
25.0	25.2	1.1	-1.1	0.12	0.2	p
24.0	24.3	1.1	-1.1	0.12	0.3	p

Test Passed

Toneburst response - IEC 61672-3 Ed.1 Clause 16

Burst type	Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
rast 200 mSec	134.0	134.0	0.8	-0.8	0.16	0.0	p
r'ast 2.0 mSec	117.0	116.8	1.3	-1.8	0.16	-0.2	p
r'ast 0.25 mSec	108.0	107.4	1.3	-3.3	0.16	-0.6	p
Slow 200 mSec	127.6	127.6	0.8	-0.8	0.16	0.0	p
Slow 2.0 mSec	108.0	107.9	1.3	-3.3	0.16	-0.1	p
SEL 200 mSec	128.0	128.0	0.8	-0.8	0.16	0.0	p
SEL 2.0 mSec	108.0	107.9	1.3	-1.8	0.16	-0.1	I?
SEL 0.25 mSec	99.0	98.8	1.3	-3.3	0.16	-0.2	I?

Test Passed

Peak C sound level - IEC 61672-3 Ed.1 Clause 17

Pulse Type	Pulse r'req . (Hz)	Ref. RMS (dB)	Ref. Peak (dB)	Measured Value (dB)	Lim. (+/-dB)	Uncert. (dB)	Dev. (dB)	Result
1 cycle	8k	126.0	129.4	129.1	2.4	0.2	-0.3	p
Pos 1/2 cycle	500	129.0	131.4	131.2	1.4	0.2	-0.2	p
Neg 1/2 cycle	500	129.0	131.4	131.2	1.4	0.2	-0.2	p

Test Passed

Overload indication - IEC 61672-3 Ed.1 Clause 18

	Measured (dB)	Lim. (+/-dB)	Uncer (dB)	Result
Level difference of positive and negative pulses:	0.1	1.8	0.16	p
Positive 1/2 cycle 4 kHz. Overload occurred at:	138.6			
Negative 1/2 cycle 4 kHz. Overload occurred at:	138.7			

Test Passed

*** End of results***

Date	Duration	Description	LAeq	LAmax	LA90	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 19:19:45.00)	(0:10:0.0)	Kitchen Door - Open (at source)	52.2	75.0	44.8	60.2	56.0	57.5	54.4	50.4	49.8	49.2	50.4	44.3	47.6	42.4	43.9	45.6	45.3	47.0	44.2	43.0	42.2	41.9	41.0	39.3	37.4	35.1	33.6	32.1	30.4	29.1	26.9	24.6	20.9	16.2
(2021/02/18 19:19:47.00)	(0:10:0.0)	Kitchen Door - open window	38.1	57.8	33.8	48.9	48.9	48.2	41.9	38.6	34.4	37.1	40.9	35.7	34.2	33.2	33.2	33.8	31.0	30.2	29.7	29.8	28.8	27.7	25.8	23.8	21.6	19.4	17.9	15.8	14.0	12.1	9.7	7.9	6.0	5.9

Date	Duration	Description	LAeq	LAmax	LA90	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 17:31:38.00)	(0:5:0.0)	LEV - at source	63.5	64.9	63.0	81.5	79.3	77.2	75.0	72.7	69.5	66.8	61.5	58.4	58.5	58.8	53.5	58.0	55.9	57.6	55.7	58.5	53.2	50.1	49.8	48.0	45.6	42.5	39.5	36.2	32.5	28.6	25.2	23.4	17.6	11.4
(2021/02/18 18:02:30.00)	(0:10:0.0)	LEV - Window Closed	40.0	67.5	25.9	49.2	48.8	45.8	42.7	36.7	33.8	32.1	34.0	29.6	29.6	32.2	30.4	29.8	27.9	33.6	34.9	29.6	29.9	27.3	27.8	29.3	28.3	25.6	21.9	22.8	16.5	14.7	12.3	10.7	7.8	6.7
(2021/02/18 18:14:10.00)	(0:10:0.0)	LEV - Window Open	47.9	77.2	33.3	50.7	52.4	52.9	44.2	41.0	37.7	41.3	45.2	41.4	41.0	38.5	38.7	41.4	39.1	43.2	41.0	42.1	38.8	36.5	34.1	31.9	29.3	27.4	26.5	23.0	20.7	20.2	18.4	15.7	12.6	9.7

Date	Duration	Description	LAeq	LAmax	LA90	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 18:27:34.00)	(0:10:0.0)	Heat Exchanger - Active Window Closed	36.7	62.2	28	54.3	50.1	49.9	44.8	40	40	37.9	37.7	36.3	31.6	34	31.8	29.5	28.9	29.1	27.7	26.7	25.7	25.3	25.1	24.6	23.1	21.6	19.8	17.6	15.8	14.1	12.5	10.7	8.5	7.3
(2021/02/18 18:41:42.00)	(0:10:0.0)	Heat Exchanger - Active Window Open	37.8	60.2	32.9	51.9	45	47.3	41	37.2	35.8	37.6	40.8	37.7	35	37.6	34.2	31.4	29.9	28.5	28.2	28.3	27.2	26.1	25.7	24.2	24.5	21.8	18.8	20.4	14.6	13	11.3	9.9	7.2	6.6
(2021/02/18 17:54:57.00)	(0:1:0.0)	Heat exchanger at source	63.1	83.2	47.6	55.6	50.8	48.8	50.2	52.8	49.6	54	57	59.9	52.1	51.9	51.6	50.1	49.2	50.9	52.3	52.3	50.4	55.2	55.5	50.3	52.7	50.4	43.1	43.9	45.4	39.7	38.7	49.5	43.1	29.1

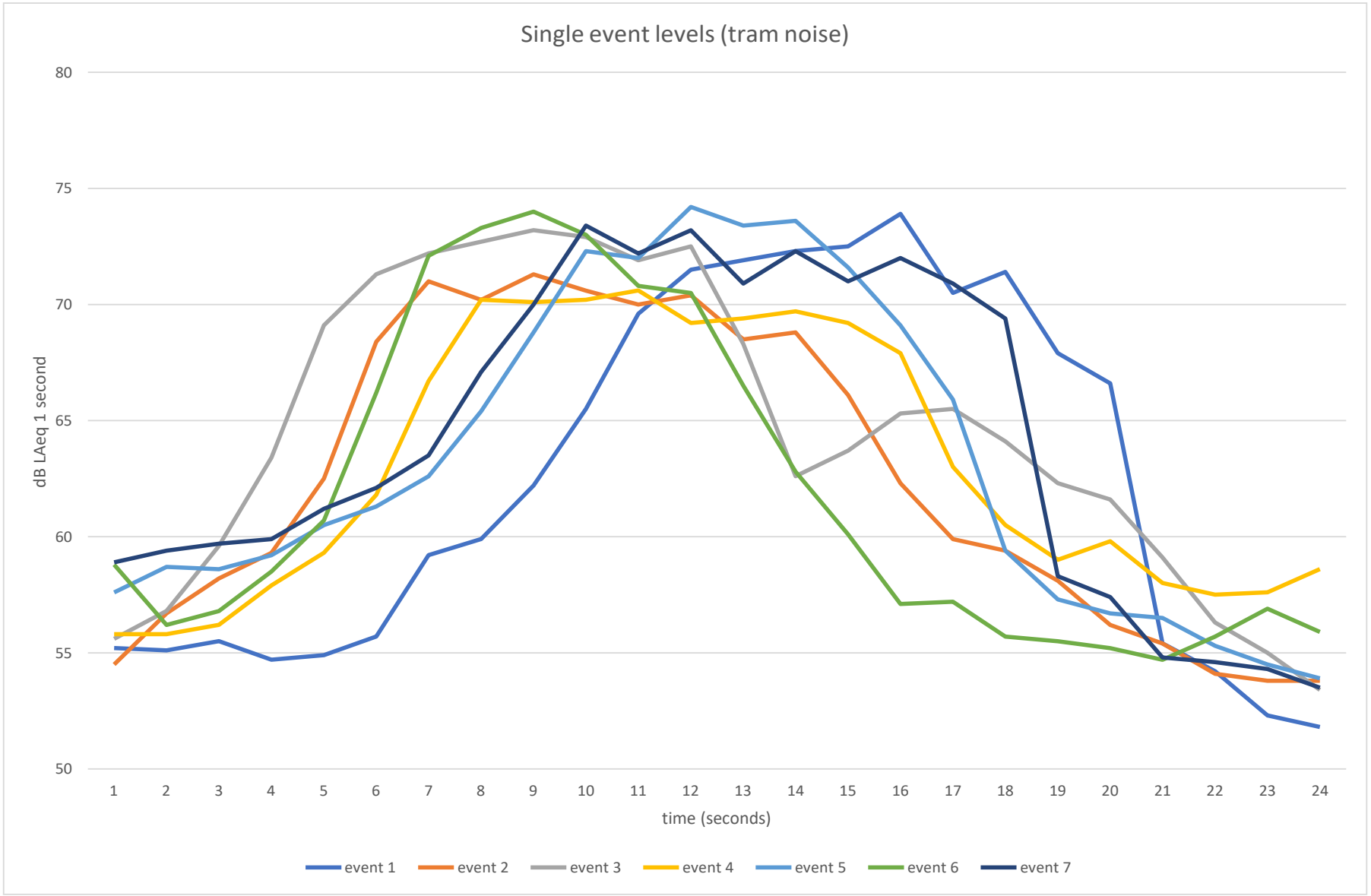
Date	Duration	Description	LAeq	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 17:31:38.00)	(0:5:0.0)	LEV - On	63.5	81.5	79.3	77.2	75.0	72.7	69.5	66.8	61.5	58.4	58.5	58.8	53.5	58.0	55.9	57.6	55.7	58.5	53.2	50.1	49.8	48.0	45.6	42.5	39.5	36.2	32.5	28.6	25.2	23.4	17.6	11.4
(2021/02/18 17:54:57.00)	(0:1:0.0)	Heat Exchanger	63.1	55.6	50.8	48.8	50.2	52.8	49.6	54.0	57.0	59.9	52.1	51.9	51.6	50.1	49.2	50.9	52.3	52.3	50.4	55.2	55.5	50.3	52.7	50.4	43.1	43.9	45.4	39.7	38.7	49.5	43.1	29.1
(2021/02/18 19:19:45.00)	(0:10:0.0)	Kitchen door open	52.2	60.2	56.0	57.5	54.4	50.4	49.8	49.2	50.4	44.3	47.6	42.4	43.9	45.6	45.3	47.0	44.2	43.0	42.2	41.9	41.0	39.3	37.4	35.1	33.6	32.1	30.4	29.1	26.9	24.6	20.9	16.2

Time	Restaurant	Apartment	Difference	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 19:41:02.00)	76.9	37	39.9	14.8	20.5	14.2	17	13.7	13.9	25.8	28.1	32	29.2	38.2	40.3	40.3	46.3	49.5	54	53.9	55.6	56	55.1	55.8	54.9	53.8	52	52.3	52.1	51.8	49.8	50	47.8	37.5
(2021/02/18 19:42:02.00)	76	38.9	37.1	10.9	16.5	12	16.9	13.6	13.3	22.5	30.7	32.2	29.1	37.8	38.9	39.6	46.2	48.2	53.2	53.9	55.5	54.5	54.1	56	54.3	52.9	52.2	51.4	50.9	50.8	48.9	49.2	47	36.5
(2021/02/18 19:43:02.00)	76.4	36.8	39.6	11.8	19.4	14.3	17.5	13.7	13.6	21.8	30.8	31.4	29.9	38	39	38.9	42.3	45.3	51.3	52.9	53.3	53.2	54.3	57.9	56.9	54.2	54.2	52.6	51.1	51.9	49.1	49.6	47.2	37.1
(2021/02/18 19:44:02.00)	76.2	36.7	39.5	12.5	18	12	16.6	13.7	13.7	22.4	30.4	31.8	30	38	39.6	39.4	42.3	48	52.6	53.7	56	56.5	55.4	56.9	55.7	52.9	51.9	51.1	50	50.2	48.3	48.4	46.1	35.3
(2021/02/18 19:45:02.00)	75.8	38.9	36.9	15.6	21.3	16	18.2	13.8	13.5	22	30.5	32	29.7	37.9	39.6	39.2	43.6	47.2	52.5	54.2	56.3	54.4	53.6	55.1	53.9	52.5	52.2	51.2	49.9	50.3	48.1	49.4	46.1	36.2
(2021/02/18 19:46:01.00)	77.7	38	39.7	13.2	20.4	13.5	17.4	14.2	14.3	24	29.1	32.4	29.4	38.2	40.4	39.2	38.4	43.8	50.8	55.9	54.9	49.3	49.2	53	50	49.5	50.3	49.9	49.1	49.3	48.4	48.8	46.8	36.5
(2021/02/18 19:47:02.00)	76.2	39.3	36.9	11.3	17.1	12.2	16.7	14.1	14.2	20.7	31.6	31.4	30	38.5	39.7	39	42.2	44.4	51	51.6	52.3	46.6	50.8	53.3	51.6	52.8	51.4	50.8	49.9	50.5	48.8	49.3	46.9	36.8
(2021/02/18 19:48:02.00)	76.2	38.9	37.3	10.9	13.7	12.2	14.1	14.3	14.4	20.8	32	31.2	30.5	38	38.3	37	38.3	40.5	45.2	46	49.3	45.9	46.2	48.3	48.6	48.5	48.4	48.8	48.9	49.1	47.1	48.4	46.3	35.8

	48977882	5012		30	112	26	50	23	25	380	646	1585	933	6607	10233	10233	40738	89125	251189	245471	363078	398107	323594	380189	309030	239883	158489	177828	162181	151356	95499	100000	60256	5623
	39810717	7762		12	45	16	49	23	21	178	1175	1660	813	6026	7762	9120	41687	66069	208930	245471	354813	281838	257040	398107	269153	194984	186209	138038	112202	120226	77625	83176	50119	4467
	43651583	4786		15	87	27	56	23	23	151	1202	1380	977	6310	7943	7079	16982	33884	134896	194984	213796	208930	269153	562341	446684	263027	263027	181970	128825	141254	93325	91201	52481	5129
	41686938	4677		18	63	16	46	23	23	174	1096	1514	1000	6310	9120	8710	16218	63096	181970	234423	398107	446684	346737	489779	371535	194984	141254	128825	100000	104713	67608	69183	40738	3388
	38018940	7762		36	135	40	66	24	22	158	1122	1585	933	6166	9120	8318	22909	52481	177828	263027	478630	275423	229087	323594	223872	177828	165959	131826	89125	107152	74131	81283	46774	4169
	58884366	6310		21	110	22	55	26	27	251	813	1738	933	6607	10965	8318	6918	23988	120226	389045	309030	85114	83176	199526	100000	89125	107152	97724	81283	95499	69183	75858	47863	4467
	41686938	8511		13	51	17	47	26	26	117	1445	1380	1000	7079	9333	7943	16596	27542	125893	144544	169824	45709	120226	213796	144544	190546	138038	120226	89125	112202	75858	85114	48978	4786
	41686938	7762		12	23	17	26	27	28	120	1585	1318	1122	6310	6761	5012	6457	11220	33113	39811	85114	38905	41687	67608	72444	70795	69183	75858	70795	81283	58884	69183	42658	3802
	76	38																																
				13	**19**	**14**	**17**	**14**	**14**	**23**	**31**	**32**	**30**	**38**	**39**	**39**	**43**	**47**	**52**	**53**	**55**	**53**	**53**	**55**	**54**	**52**	**52**	**51**	**50**	**51**	**49**	**49**	**47**	**37**
adjusted for background																																		
below																																		
(2021/02/18 19:41:02.00)				60.1	58.4	52.3	52.6	68.0	71.1	71.9	74.8	76.9	72.7	76.7	72.8	70.7	67.1	70.6	69.8	66.6	67.7	65.3	64.0	62.4	61.1	59.8	58.1	58.7	58.4	58.3	56.0	55.6	52.6	43.1
(2021/02/18 19:42:02.00)				57.7	53.7	49.5	52.6	68.7	72.0	75.2	80.3	80.4	74.3	74.8	70.7	65.8	65.9	67.3	68.3	66.4	67.0	63.1	63.0	63.4	61.0	59.2	59.0	57.7	56.8	57.2	55.1	54.8	51.8	42.1
(2021/02/18 19:43:02.00)				59.1	57.1	52.0	53.5	68.3	70.7	72.4	77.3	77.5	72.4	71.8	69.0	65.6	62.4	63.8	67.2	68.0	68.2	65.2	64.7	65.5	63.4	60.6	60.6	58.9	57.5	58.0	55.9	55.2	52.0	42.7
(2021/02/18 19:44:02.00)				58.2	54.0	49.7	51.8	66.8	69.7	71.0	74.8	75.4	72.9	77.0	74.2	70.9	61.9	66.6	68.2	65.5	66.6	64.9	63.7	63.7	62.0	59.0	57.8	57.4	56.4	56.7	54.5	54.0	50.9	40.9
(2021/02/18 19:45:02.00)				61.2	59.0	53.8	54.4	68.8	72.2	75.4	80.8	79.8	74.3	74.9	71.7	67.0	64.1	67.0	67.8	66.4	67.3	62.8	62.5	62.3	60.2	59.0	58.6	57.5	55.9	56.8	54.9	54.7	51.5	41.8
(2021/02/18 19:46:01.00)				60.1	57.6	51.2	53.2	68.0	71.7	72.0	78.8	78.4	73.7	75.8	74.4	68.6	60.9	62.4	67.3	72.6	69.3	63.4	63.3	67.2	63.3	60.8	60.7	59.8	57.6	57.5	55.4	55.0	51.8	42.2
(2021/02/18 19:47:02.00)				58.5	53.8	50.0	53.5	70.5	73.9	75.1	82.5	78.7	73.5	74.4	70.9	67.0	63.2	65.6	67.8	68.0	66.1	61.4	63.1	64.6	62.5	62.3	60.2	58.8	56.8	57.5	55.4	55.1	51.8	42.4
(2021/02/18 19:48:02.00)				58.3	53.6	50.4	53.6	70.5	73.4	74.9	82.3	77.7	72.0	72.5	68.3	66.5	64.7	66.2	67.9	67.3	67.7	63.5	64.3	64.9	62.7	60.2	59.1	58.3	56.8	56.8	54.8	54.5	51.4	41.5
above																																		
(2021/02/18 19:41:02.00)				45.3	37.9	38.1	35.6	54.3	57.2	46.1	46.7	44.9	43.0	38.5	32.7	30.6	21.0	21.1	15.8	12.7	12.1	9.3	8.9	6.6	6.2	6.0	6.1	6.2	6.3	6.5	6.2	5.6	4.8	5.6
(2021/02/18 19:42:02.00)				46.8	37.2	37.5	35.7	55.1	58.7	52.7	49.6	48.2	45.2	37.0	31.8	26.2	19.7	19.1	15.1	12.5	11.5	8.6	8.9	7.4	6.7	6.3	6.3	6.3	6.3	6.4	6.2	5.6	4.8	5.6
(2021/02/18 19:43:02.00)				47.3	37.7	37.7	36.0	54.6	57.1	50.6	46.5	46.1	42.5	33.8	30.0	27.1	20.1	18.5	15.9	15.1	14.9	12.0	10.4	8.0	6.9	6.4	6.4	6.3	6.4	6.5	6.2	5.6	4.8	5.6
(2021/02/18 19:44:02.00)				45.7	36.0	37.7	35.2	53.1	56.0	48.6	44.4	43.6	42.9	39.0	34.6	31.5	19.8	18.6	15.6	11.8	10.6	8.4	8.3	6.8	6.3	6.1	6.3	6.3	6.4	6.5	6.2	5.6	4.8	5.6
(2021/02/18 19:45:02.00)				45.6	37.7	37.8	36.2	55.0	58.7	53.4	50.3	47.8	44.6	37.0	32.1	27.8	20.5	19.8	15.3	12.2	10.5	8.4	8.9	7.2	6.7	6.5	6.4	6.3	6.4	6.5	6.2	5.6	4.8	5.6
(2021/02/18 19:46:01.00)				46.9	37.2	37.7	35.8	53.8	57.4	48.0	49.7	46.0	44.0	37.6	34.0	29.4	22.5	18.6	16.5	16.7	14.4	14.1	14.1	14.2	13.3	11.3	10.4	9.9	8.5	7.7	7.0	6.2	5.0	5.7
(2021/02/18 19:47:02.00)				47.2	36.7	37.8	36.8	56.4	59.7	54.4	50.9	47.3	43.5	35.9	31.2	28.0	21.0	21.2	16.8	16.4	13.8	14.8	12.3	11.3	10.9	9.5	8.8	8.0	7.3	7.0	6.6	5.8	4.9	5.6
(2021/02/18 19:48:02.00)				47.4	39.9	38.2	39.5	56.2	59.0	54.1	50.3	46.5	41.5	34.5	30.0	29.5	26.6	25.7	22.7	21.3	18.4	17.6	18.1	16.6	14.1	11.7	10.7	9.5	8.3	7.7	7.1	6.1	5.1	5.7
background				54.3	50.1	49.9	44.8	40.0	40.0	37.9	37.7	36.3	31.6	34.0	31.8	29.5	28.9	29.1	27.7	26.7	25.7	25.3	25.1	24.6	23.1	21.6	19.8	17.6	15.8	14.1	12.5	10.7	8.5	7.3
				269153	102329	97724	30200	10000	10000	6166	5888	4266	1445	2512	1514	891	776	813	589	468	372	339	324	288	204	145	95	58	38	26	18	12	7	5
antilog restaurant				1023293	691831	169824	181970	6309573	12882496	15488166	30199517	48977882	18620871	46773514	19054607	11748976	5128614	11481536	9549926	4570882	5888437	3388442	2511886	1737801	1288250	954993	645654	741310	691831	676083	398107	363078	181970	20417
				588844	234423	89125	181970	7413102	15848932	33113112	107151931	109647820	26915348	30199517	11748976	3801894	3890451	5370318	6760830	4365158	5011872	2041738	1995262	2187762	1258925	831764	794328	588844	478630	524807	323594	301995	151356	16218
				812831	512861	158489	223872	6760830	11748976	17378008	53703180	56234133	17378008	15135612	7943282	3630781	1737801	2398833	5248075	6309573	6606934	3311311	2951209	3548134	2187762	1148154	1148154	776247	562341	630957	389045	331131	158489	18621
				660693	251189	93325	151356	4786301	9332543	12589254	30199517	34673685	19498446	50118723	26302680	12302688	1548817	4570882	6606934	3548134	4570882	3090295	2344229	2344229	1584893	794328	602560	549541	436516	467735	281838	251189	123027	12303
				1318257	794328	239883	275423	7585776	16595869	34673685	120226443	95499259	26915348	30902954	14791084	5011872	2570396	5011872	6025596	4365158	5370318	1905461	1778279	1698244	1047129	794328	724436	562341	389045	478630	309030	295121	141254	15136
				1023293	575440	131826	208930	6309573	14791084	15848932	75857758	69183097	23442288	38018940	27542287	7244360	1230269	1737801	5370318	18197009	8511380	2187762	2137962	5248075	2137962	1202264	1174898	954993	575440	562341	346737	316228	151356	16596
				707946	239883	100000	223872	11220185	24547089	32359366	177827941	74131024	22387211	27542287	12302688	5011872	2089296	3630781	6025596	6309573	4073803	1380384	2041738	2884032	1778279	1698244	1047129	758578	478630	562341	346737	323594	151356	17378
				676083	229087	109648	229087	11220185	21877616	30902954	169824365	58884366	15848932	17782794	6760830	4466836	2951209	4168694	6165950	5370318	5888437	2238721	2691535	3090295	1862087	1047129	812831	676083	478630	478630	301995	281838	138038	14125
antilog apartment				33884	6166	6457	3631	269153	524807	40738	46774	30903	19953	7079	1862	1148	126	129	38	19	16	9	8	5	4	4	4	4	4	4	4	4	3	4
				47863	5248	5623	3715	323594	741310	186209	91201	66069	33113	5012	1514	417	93	81	32	18	14	7	8	5	5	4	4	4	4	4	4	4	3	4
				53703	5888	5888	3981	288403	512861	114815	44668	40738	17783	2399	1000	513	102	71	39	32	31	16	11	6	5	4	4	4	4	4	4	4	3	4
				37154	3981	5888	3311	204174	398107	72444	27542	22909	19498	7943	2884	1413	95	72	36	15	11	7	7	5	4	4	4	4	4	4	4	4	3	4
				36308	5888	6026	4169	316228	741310	218776	107152	60256	28840	5012	1622	603	112	95	34	17	11	7	8	5	5	4	4	4	4	4	4	4	3	4
				48978	5248	5888	3802	239883	549541	63096	93325	39811	25119	5754	2512	871	178	72	45	47	28	26	26	26	21	13	11	10	7	6	5	4	3	4
				52481	4677	6026	4786	436516	933254	275423	123027	53703	22387	3890	1318	631	126	132	48	44	24	30	17	13	12	9	8	6	5	5	5	4	3	4
				54954	9772	6607	8913	416869	794328	257040	107152	44668	14125	2818	1000	891	457	372	186	135	69	58	65	46	26	15	12	9	7	6	5	4	3	4

Average levels																																		
restaurant				59	56	51	53	69	72	74	80	78	73	75	72	68	64	67	68	68	68	64	64	63	62	60	59	58	57	57	55	55	53	41
apartment				47	38	38	37	55	58	52	49	47	44	37	32	29	22	23	18	16	14	13	13	11	10	9	8	8	7	7	6	6	5	6
background				54	50	50	45	40	40	38	38	36	32	34	32	30	29	29	28	27	28	25	25	25	23	22	20	18	16	14	13	11	9	5
apartment background adjusted				-	-	-	-	55	58	52	49	46	43	34	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 2.2 – Baseline Survey of Tram Noise


Single event levels (tram noise)
80
75
70
65
60
55
50
dB LAeq 1 second
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
time (seconds)
event 1
event 2
event 3
event 4
event 5
event 6
event 7

time (seconds)	event 1	event 2	event 3	event 4	event 5	event 6	event 7
1	55.2	54.5	55.6	55.8	57.6	58.8	58.9
2	55.1	56.7	56.8	55.8	58.7	56.2	59.4
3	55.5	58.2	59.6	56.2	58.6	56.8	59.7
4	54.7	59.3	63.4	57.9	59.2	58.5	59.9
5	54.9	62.5	69.1	59.3	60.5	60.7	61.2
6	55.7	68.4	71.3	61.8	61.3	66.2	62.1
7	59.2	71	72.2	66.7	62.6	72.1	63.5
8	59.9	70.2	72.7	70.2	65.4	73.3	67.1
9	62.2	71.3	73.2	70.1	68.8	74	70
10	65.5	70.6	72.9	70.2	72.3	73	73.4
11	69.6	70	71.9	70.6	72	70.8	72.2
12	71.5	70.4	72.5	69.2	74.2	70.5	73.2
13	71.9	68.5	68.3	69.4	73.4	66.5	70.9
14	72.3	68.8	62.6	69.7	73.6	62.8	72.3
15	72.5	66.1	63.7	69.2	71.6	60.1	71
16	73.9	62.3	65.3	67.9	69.1	57.1	72
17	70.5	59.9	65.5	63	65.9	57.2	70.9
18	71.4	59.4	64.1	60.5	59.4	55.7	69.4
19	67.9	58.1	62.3	59	57.3	55.5	58.3
20	66.6	56.2	61.6	59.8	56.7	55.2	57.4
21	55.4	55.4	59.1	58	56.5	54.7	54.8
22	54.2	54.1	56.3	57.5	55.3	55.7	54.6
23	52.3	53.8	55	57.6	54.5	56.9	54.3
24	51.8	53.8	53.4	58.6	53.9	55.9	53.5
SEL	81.6	80.2	82.0	80.0	81.8	81.0	82.2
Averge SEL	81.3						

	LAeq	LAmax	LA90	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
South Tram	64.3	75.4	53.5	63	61	60	62	62	69	74	70	60	58	56	57	58	59	57	55	56	57	52	51	50	44	44	46	37	35	32	27	26	20	18
North Tram	63.0	71.9	53.1	66	64	62	62	63	67	70	68	64	57	57	57	58	57	56	54	54	56	50	50	49	43	43	47	36	35	39	27	24	23	19
South Tram	62.4	74.5	53.9	63	61	61	61	62	65	69	70	59	55	55	55	55	56	55	53	55	56	49	50	48	42	42	45	35	33	28	25	23	16	14
North Tram	61.5	72.2	54.6	74	73	72	71	69	66	66	65	60	56	56	57	56	56	54	52	53	53	49	50	47	46	41	41	32	29	35	23	19	17	15
South Tram	61.3	72.8	52.9	60	60	58	62	65	61	62	62	57	56	55	54	55	54	53	52	54	53	51	51	48	44	42	43	34	32	27	26	25	20	20
North Tram	62.8	74.7	51.7	65	63	61	60	64	65	69	70	63	57	54	55	54	56	55	53	55	56	52	49	49	44	42	43	34	34	30	26	24	19	16
South Tram	65.9	74.7	56.4	68	67	66	68	70	69	75	72	60	59	60	59	57	58	57	55	58	59	56	53	53	49	47	47	40	37	34	30	28	27	21

Appendix 3 – Noise Model Outputs

Constitution Street
Run info
"cooler calibration.sit"

Project description

Project title: Constitution Street
Project No.: AS 0792
Project engineer: Jack
Customer:

Description:
Noise impact assessment for change of use.

Run description

Calculation type: Single Point Sound
Title: "cooler calibration.sit"
Group
Run file: RunFile.runx
Result number: 7
Local calculation (ThreadCount=12)
Calculation start: 12/04/2021 16:01:45
Calculation end: 12/04/2021 16:01:46
Calculation time: 00:00:093 [m:s:ms]
No. of points: 2
No. of calculated points: 2
Kernel version: SoundPLAN 8.2 (07/10/2020) - 32 bit

Run parameters

Reflection order: 3
Maximum reflection distance to receiver 200 m
Maximum reflection distance to source 50 m
Search radius 5000 m
Weighting: dB(A)
Allowed tolerance (per individual source): 0.100 dB
Create ground effect areas from road surfaces: No

Standards:
- Industry: ISO 9613-2: 1996
- Air absorption: ISO 9613-1

regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect

- Limitation of screening loss:
  - single/multiple 20.0 dB /25.0 dB
- Side diffraction: Outdated method (side paths also around terrain)
- Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
- Environment:
  - Air pressure 1013.3 mbar
  - rel. humidity 70.0 %
  - Temperature 10.0 °C
  - Meteo. corr. C0(7-23h)[dB]=0.0; C0(23-7h)[dB]=0.0;
  - Ignore Cmet for Lmax industry calculation: No
- Parameter for screening: C2=20.0

Distance to diameter factor	8
Minimal distance	1 m
Max. difference ground effect + diffraction	1.0 dB
Max. number of iterations	4

Attenuation

Foliage:	ISO 9613-2
Built-up area:	ISO 9613-2
Industrial site:	ISO 9613-2

Assessment: PPG24 (day/night)
Reflection of "own" facade is suppressed

Geometry data

cooler LEV calibration.sit	12/04/2021 16:00:08
- contains:	
calc area.geo	16/11/2020 20:47:00
cooler calibration.geo	12/04/2021 15:18:56
Geo-File1.geo	10/11/2020 23:47:24
Geo-File3.geo	12/04/2021 15:18:12
ground conditions.geo	12/04/2021 15:07:34
LEV calibration.geo	12/04/2021 15:15:30
mastermap.geo	23/02/2021 13:49:48
sources.geo	12/04/2021 16:00:08
RDGM0001.dgm	10/11/2020 23:45:52

Constitution Street
Assessed receiver levels
"cooler calibration.sit"

RNo	Receiver	Fl	Dir	X m	Y m	Z m	LrD dB(A)	LrN dB(A)
1	cooler cal	GF		327175	676207	9.8	50	49
2	LEV cal	GF		327172	676197	16.1	55	27

Constitution Street
Assessed receiver spectra in dB(A) - "cooler calibration.sit"

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver cooler cal Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 50 dB(A) LrN 49 dB(A)									
LrD	25.8	32.8	35.1	40.5	44.6	45.4	39.2	32.7	31.6
LrN	18.7	31.9	33.5	39.1	44.1	45.4	39.1	32.6	31.6
Receiver LEV cal Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 55 dB(A) LrN 27 dB(A)									
LrD	40.1	40.7	45.0	50.2	50.2	43.8	38.8	32.3	20.5
LrN	-3.2	9.9	11.6	17.1	22.1	23.3	16.8	9.6	6.5

Constitution Street
Octave spectra of the sources in dB(A) - "cooler calibration.sit"

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
aircon unit - Facade 01	Area	0.30			62.7	57.5	0.0	0.0		0	100%/24h	Con Street Heat exchanger	27.0	40.2	41.8	47.3	52.4	53.6	47.4	41.0	40.2
LEV	Area	0.07			80.6	68.9	0.0	0.0		0	cooler	Con Street LEV	54.3	54.9	59.1	64.4	64.3	57.9	53.0	46.6	35.1

Constitution Street
Run info
tram calibration

Project description

Project title: Constitution Street
Project No.: AS 0792
Project engineer: Jack
Customer:

Description:
Noise impact assessment for change of use.

Run description

Calculation type: Single Point Sound
Title: tram calibration
Group
Run file: RunFile.runx
Result number: 4
Local calculation (ThreadCount=12)
Calculation start: 12/04/2021 16:01:44
Calculation end: 12/04/2021 16:01:44
Calculation time: 00:00:104 [m:s:ms]
No. of points: 1
No. of calculated points: 1
Kernel version: SoundPLAN 8.2 (07/10/2020) - 32 bit

Run parameters

Reflection order: 3
Maximum reflection distance to receiver 200 m
Maximum reflection distance to source 50 m
Search radius 5000 m
Weighting: dB(A)
Allowed tolerance (per individual source): 0.100 dB
Create ground effect areas from road surfaces: No

Standards:
- Industry: ISO 9613-2: 1996
- Air absorption: ISO 9613-1

regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect

- Limitation of screening loss:
  - single/multiple 20.0 dB /25.0 dB
- Side diffraction: Outdated method (side paths also around terrain)
- Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
- Environment:
  - Air pressure 1013.3 mbar
  - rel. humidity 70.0 %
  - Temperature 10.0 °C
  - Meteo. corr. C0(7-23h)[dB]=0.0; C0(23-7h)[dB]=0.0;
  - Ignore Cmet for Lmax industry calculation: No
- Parameter for screening: C2=20.0

Distance to diameter factor	8
Minimal distance	1 m
Max. difference ground effect + diffraction	1.0 dB
Max. number of iterations	4

Attenuation

Foliage:	ISO 9613-2
Built-up area:	ISO 9613-2
Industrial site:	ISO 9613-2

Assessment: PPG24 (day/night)
Reflection of "own" facade is suppressed

Geometry data

tram calibration.sit	12/04/2021	15:09:12
- contains:		
calc area.geo	16/11/2020	20:47:00
Geo-File1.geo	10/11/2020	23:47:24
ground conditions.geo	12/04/2021	15:07:34
mastermap.geo	23/02/2021	13:49:48
tram calibration.geo	23/02/2021	13:34:38
trams.geo	12/04/2021	15:09:06
RDGM0001.dgm	10/11/2020	23:45:52

Constitution Street
Assessed receiver levels
tram calibration

2

RNo	Receiver	Usage	Fl	Dir	X m	Y m	Z m	LrD dB(A)
1	tram cal	SCR	GF		327184	676201	9.0	58

Constitution Street
Contribution level - tram calibration

Source	Source group	Source ty	Tr. lane	LrD dB(A)	LrN dB(A)	A dB	
Receiver tram cal Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 58 dB(A) LrN 55 dB(A)							
tram South to North	Default industrial noise	Line		56.0	53.0	0.0	
tram North to South	Default industrial noise	Line		52.8	49.8	0.0	

Constitution Street
Octave spectra of the sources in dB(A) - tram calibration

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
tram North to South	Line	180.16			14.3	36.8	0.0	0.0		0	trams	trams	23.4	25.7	26.6	30.8	32.3	28.4	22.5	11.2	-5.2
tram South to North	Line	180.95			14.3	36.8	0.0	0.0		0	trams	trams	23.5	25.7	26.6	30.8	32.3	28.4	22.5	11.2	-5.2

Constitution Street
Run info
scenario 1

Project description

Project title: Constitution Street
Project No.: AS 0792
Project engineer: Jack
Customer:

Description:
Noise impact assessment for change of use.

Run description

Calculation type: Single Point Sound
Title: scenario 1
Group
Run file: RunFile.runx
Result number: 2
Local calculation (ThreadCount=12)
Calculation start: 12/04/2021 16:01:44
Calculation end: 12/04/2021 16:01:45
Calculation time: 00:00:592 [m:s:ms]
No. of points: 14
No. of calculated points: 14
Kernel version: SoundPLAN 8.2 (07/10/2020) - 32 bit

Run parameters

Reflection order: 3
Maximum reflection distance to receiver 200 m
Maximum reflection distance to source 50 m
Search radius 5000 m
Weighting: dB(A)
Allowed tolerance (per individual source): 0.100 dB
Create ground effect areas from road surfaces: No

Standards:
- Industry: ISO 9613-2: 1996
- Air absorption: ISO 9613-1

regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect

- Limitation of screening loss:
  - single/multiple 20.0 dB /25.0 dB
- Side diffraction: Outdated method (side paths also around terrain)
- Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
- Environment:
  - Air pressure 1013.3 mbar
  - rel. humidity 70.0 %
  - Temperature 10.0 °C
  - Meteo. corr. C0(7-23h)[dB]=0.0; C0(23-7h)[dB]=0.0;
  - Ignore Cmet for Lmax industry calculation: No
- Parameter for screening: C2=20.0

Dissection parameters:

Distance to diameter factor	8
Minimal distance	1 m
Max. difference ground effect + diffraction	1.0 dB
Max. number of iterations	4

Attenuation

Foliage:	ISO 9613-2
Built-up area:	ISO 9613-2
Industrial site:	ISO 9613-2

Assessment: PPG24 (day/night)

Reflection of "own" facade is suppressed

Geometry data

Scenario 1.sit	12/04/2021 15:28:02
- contains:	
calc area.geo	16/11/2020 20:47:00
existing buildings.geo	23/02/2021 15:23:18
Geo-File1.geo	10/11/2020 23:47:24
ground conditions.geo	12/04/2021 15:07:34
mastermap.geo	23/02/2021 13:49:48
receptors.geo	12/04/2021 15:20:12
sources.geo	12/04/2021 16:00:08
RDGM0001.dgm	10/11/2020 23:45:52

Constitution Street
Assessed receiver levels
scenario 1

2

RNo	Receiver	Fl	Dir	X m	Y m	Z m	LrD dB(A)	LrN dB(A)
2	100 - west of site courtyard	GF	SE	327174	676214	9.4	34	26
		F 1				11.9	33	26
		F 2				14.4	35	25
		F 3				16.9	37	24
3	102-104 constitution street	GF	NE	327168	676201	9.2	44	35
		F 1				11.7	46	35
1	94 constitution street	GF	SW	327180	676223	8.8	27	21
		F 1				11.3	28	21
		F 2				13.8	31	21
4	houses rear	GF	SE	327169	676205	9.2	40	36
		F 1				11.7	41	36
5	north of site site 1st floor	GF	SE	327187	676212	13.1	27	6
6	site 1st floor	GF	NW	327172	676203	13.1	44	36
~~7~~	~~site 1st floor~~	~~GF~~	~~NW~~	~~327171~~	~~676201~~	~~13.1~~	~~46~~	~~34~~
8	site 1st floor	GF	SE	327184	676207	13.1	28	8
9	site 1st floor	GF	SE	327180	676199	13.1	30	7
10	site 1st floor	GF	SE	327178	676196	13.1	29	7
11	site 1st floor	GF	SE	327185	676209	13.1	27	8
12	site 1st floor archway back	GF	NW	327174	676206	13.1	43	39
13	site 1st floor archway front	GF	SE	327182	676202	13.1	29	8
14	south of site 1st floor	GF	SE	327174	676188	13.1	29	5

Constitution Street
Assessed receiver spectra in dB(A) - scenario 1

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver 100 - west of site courtyard Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 34 dB(A) LrN 26 dB(A)									
LrD	20.9	20.2	24.1	29.1	29.4	25.3	19.2	11.3	2.9
LrN	-11.7	2.5	5.5	15.3	21.6	22.9	16.1	7.9	2.4
Receiver 100 - west of site courtyard Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 33 dB(A) LrN 26 dB(A)									
LrD	17.6	18.4	22.6	28.0	28.9	25.3	19.7	12.9	3.4
LrN	-10.8	3.5	6.2	15.6	21.4	22.7	15.8	7.5	1.9
Receiver 100 - west of site courtyard Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 35 dB(A) LrN 25 dB(A)									
LrD	18.1	19.1	23.6	29.5	31.2	27.3	21.8	14.2	2.6
LrN	-10.4	4.3	4.5	12.5	19.9	21.5	14.6	6.2	0.4
Receiver 100 - west of site courtyard Fl F 3 LrD,lim dB(A) LrN,lim dB(A) LrD 37 dB(A) LrN 24 dB(A)									
LrD	18.3	19.7	25.2	32.5	33.2	27.8	22.2	14.2	2.3
LrN	-10.5	4.7	5.5	13.0	19.3	21.1	14.3	5.9	-0.1
Receiver 102-104 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 44 dB(A) LrN 35 dB(A)									
LrD	27.8	28.8	32.9	38.4	39.0	34.6	28.9	21.6	14.8
LrN	4.3	17.7	19.2	24.5	29.5	30.7	24.2	17.0	14.1
Receiver 102-104 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 46 dB(A) LrN 35 dB(A)									
LrD	30.1	31.0	35.4	41.3	41.8	36.6	31.6	25.6	16.5
LrN	4.5	18.1	19.6	24.9	29.7	30.8	24.2	16.9	14.0
Receiver 94 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 21 dB(A)									
LrD	11.1	10.1	12.3	20.9	23.3	19.4	13.5	5.8	-4.9
LrN	-20.0	-3.1	-3.3	10.7	16.0	16.9	9.9	1.2	-6.1
Receiver 94 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 28 dB(A) LrN 21 dB(A)									
LrD	12.5	12.1	14.7	22.3	24.5	20.7	15.7	7.2	-4.8
LrN	-19.1	-2.0	-1.7	11.0	16.1	17.0	10.0	1.2	-6.1
Receiver 94 constitution street Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 31 dB(A) LrN 21 dB(A)									
LrD	16.0	16.3	19.5	25.3	27.2	22.3	16.2	7.7	-4.7
LrN	-18.3	-1.0	-0.2	11.3	16.5	17.3	10.2	1.3	-6.1
Receiver houses rear Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 40 dB(A) LrN 36 dB(A)									
LrD	23.0	24.5	28.3	33.9	35.4	33.4	27.4	20.3	16.3
LrN	4.5	18.2	20.4	25.8	30.8	31.9	25.5	18.4	16.2
Receiver houses rear Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 41 dB(A) LrN 36 dB(A)									
LrD	23.7	25.3	29.6	35.7	37.1	33.9	28.3	21.8	16.3
LrN	4.3	18.1	20.4	25.7	30.6	31.7	25.3	18.2	15.9
Receiver north of site site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 6 dB(A)									
LrD	14.4	15.6	18.5	22.3	21.3	14.2	7.8	-1.7	-14.9
LrN	-16.9	-5.4	-7.4	-3.4	1.1	2.3	-4.0	-11.9	-16.2
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 44 dB(A) LrN 36 dB(A)									
LrD	30.3	30.6	33.6	38.8	39.1	34.5	28.3	20.8	16.1
LrN	5.2	18.4	20.1	25.4	30.5	31.7	25.2	18.1	15.9

Constitution Street
Assessed receiver spectra in dB(A) - scenario 1

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 46 dB(A) LrN 34 dB(A)									
~~LrD~~	~~33.8~~	~~32.7~~	~~36.8~~	~~41.8~~	~~41.4~~	~~35.5~~	~~29.5~~	~~21.8~~	~~14.6~~
~~LrN~~	~~2.9~~	~~16.4~~	~~17.9~~	~~23.7~~	~~29.2~~	~~30.5~~	~~24.0~~	~~16.7~~	~~13.8~~
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 28 dB(A) LrN 8 dB(A)									
LrD	16.1	16.6	19.6	23.3	22.2	15.2	8.9	-0.4	-12.5
LrN	-13.7	-2.7	-4.1	-1.6	2.7	3.9	-2.5	-10.2	-13.8
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 30 dB(A) LrN 7 dB(A)									
LrD	19.7	18.9	21.5	25.0	23.6	15.9	9.9	1.3	-11.7
LrN	-15.2	-4.4	-6.2	-3.1	1.4	2.4	-4.2	-11.9	-15.2
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 7 dB(A)									
LrD	20.8	19.3	21.2	23.8	21.6	13.8	8.2	0.6	-11.2
LrN	-15.2	-4.5	-5.8	-2.8	1.6	2.6	-3.6	-11.2	-15.5
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 8 dB(A)									
LrD	15.1	16.1	19.0	22.7	21.7	14.7	8.4	-1.0	-13.7
LrN	-15.2	-3.8	-5.6	-2.2	2.1	3.2	-3.2	-11.0	-15.0
Receiver site 1st floor archway back Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 43 dB(A) LrN 39 dB(A)									
LrD	27.3	28.9	32.0	37.4	38.5	36.0	29.8	22.6	19.9
LrN	7.5	21.8	23.5	28.9	33.8	34.8	28.3	21.5	19.8
Receiver site 1st floor archway front Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 8 dB(A)									
LrD	18.3	17.7	20.5	24.1	22.8	15.3	9.1	0.3	-11.6
LrN	-13.0	-2.1	-3.4	-1.5	2.6	3.7	-2.9	-10.3	-13.4
Receiver south of site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 5 dB(A)									
LrD	18.6	17.5	20.2	23.8	23.7	16.4	10.4	1.5	-13.3
LrN	-18.4	-6.6	-8.4	-4.8	0.0	1.3	-5.3	-13.6	-19.1

Constitution Street
Mean propagation Leq - scenario 1

Source	Source type	Time slice	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
Receiver 100 - west of site courtyard Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 34 dB(A) LrN 26 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	5.99	-26.5	3.0	-24.7	-0.1		0.0	17.1	26.3	0.0	0.0	0.0	26.3
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	5.99	-26.5	3.0	-24.7	-0.1		0.0	17.1	26.3	0.0	0.0	0.0	26.3
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	17.65	-35.9	3.0	-2.6	-0.1		0.0	0.2	33.5	0.0	0.0	0.0	33.5
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	17.65	-35.9	3.0	-2.6	-0.1		0.0	0.2	33.5		0.0		
Receiver 100 - west of site courtyard Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 33 dB(A) LrN 26 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	6.32	-27.0	3.0	-24.5	-0.1		0.0	17.2	26.2	0.0	0.0	0.0	26.2
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	6.32	-27.0	3.0	-24.5	-0.1		0.0	17.2	26.2	0.0	0.0	0.0	26.2
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	16.90	-35.6	3.0	-4.3	-0.1		0.0	0.5	32.5	0.0	0.0	0.0	32.5
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	16.90	-35.6	3.0	-4.3	-0.1		0.0	0.5	32.5		0.0		
Receiver 100 - west of site courtyard Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 35 dB(A) LrN 25 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	7.52	-28.5	3.0	-24.1	-0.1		0.0	16.9	24.7	0.0	0.0	0.0	24.7
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	7.52	-28.5	3.0	-24.1	-0.1		0.0	16.9	24.7	0.0	0.0	0.0	24.7
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	16.51	-35.3	3.0	-2.4	-0.1		0.0	0.7	34.8	0.0	0.0	0.0	34.8
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	16.51	-35.3	3.0	-2.4	-0.1		0.0	0.7	34.8		0.0		
Receiver 100 - west of site courtyard Fl F 3 LrD,lim dB(A) LrN,lim dB(A) LrD 37 dB(A) LrN 24 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.25	-30.3	3.0	-20.8	-0.1		0.0	15.1	24.4	0.0	0.0	0.0	24.4
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.25	-30.3	3.0	-20.8	-0.1		0.0	15.1	24.4	0.0	0.0	0.0	24.4
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	16.49	-35.3	3.0	-0.6	-0.1		0.0	1.0	36.9	0.0	0.0	0.0	36.9
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	16.49	-35.3	3.0	-0.6	-0.1		0.0	1.0	36.9		0.0		
Receiver 102-104 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 44 dB(A) LrN 35 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.70	-30.7	3.0	0.0	-0.1		0.0	4.9	34.5	0.0	0.0	0.0	34.5
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.70	-30.7	3.0	0.0	-0.1		0.0	4.9	34.5	0.0	0.0	0.0	34.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	7.53	-28.5	3.0	-5.1	0.0		0.0	4.6	42.9	0.0	0.0	0.0	42.9
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	7.53	-28.5	3.0	-5.1	0.0		0.0	4.6	42.9		0.0		
Receiver 102-104 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 46 dB(A) LrN 35 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.87	-30.9	3.0	0.0	-0.1		0.0	5.2	34.7	0.0	0.0	0.0	34.7
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.87	-30.9	3.0	0.0	-0.1		0.0	5.2	34.7	0.0	0.0	0.0	34.7
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	5.49	-25.8	3.0	-4.6	0.0		0.0	4.3	45.8	0.0	0.0	0.0	45.8
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	5.49	-25.8	3.0	-4.6	0.0		0.0	4.3	45.8		0.0		
Receiver 94 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 21 dB(A)																					

Constitution Street
Mean propagation Leq - scenario 1

Source	Source type	Time slice	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	16.08	-35.1	3.0	-24.7	-0.2		0.0	20.1	20.5	0.0	0.0	0.0	20.5
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	16.08	-35.1	3.0	-24.7	-0.2		0.0	20.1	20.5	0.0	0.0	0.0	20.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	28.03	-39.9	3.0	-15.0	-0.1		0.0	9.0	25.9	0.0	0.0	0.0	25.9
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	28.03	-39.9	3.0	-15.0	-0.1		0.0	9.0	25.9		0.0		
Receiver 94 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 28 dB(A) LrN 21 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	16.11	-35.1	3.0	-24.7	-0.2		0.0	20.1	20.6	0.0	0.0	0.0	20.6
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	16.11	-35.1	3.0	-24.7	-0.2		0.0	20.1	20.6	0.0	0.0	0.0	20.6
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	27.51	-39.8	3.0	-12.6	-0.1		0.0	8.0	27.5	0.0	0.0	0.0	27.5
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	27.51	-39.8	3.0	-12.6	-0.1		0.0	8.0	27.5		0.0		
Receiver 94 constitution street Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 31 dB(A) LrN 21 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	16.52	-35.4	3.0	-24.5	-0.2		0.0	20.6	21.0	0.0	0.0	0.0	21.0
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	16.52	-35.4	3.0	-24.5	-0.2		0.0	20.6	21.0	0.0	0.0	0.0	21.0
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	27.21	-39.7	3.0	-6.1	-0.1		0.0	4.5	30.6	0.0	0.0	0.0	30.6
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	27.21	-39.7	3.0	-6.1	-0.1		0.0	4.5	30.6		0.0		
Receiver houses rear Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 40 dB(A) LrN 36 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	6.85	-27.7	3.0	0.0	-0.1		0.0	3.1	35.8	0.0	0.0	0.0	35.8
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	6.85	-27.7	3.0	0.0	-0.1		0.0	3.1	35.8	0.0	0.0	0.0	35.8
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	10.08	-31.1	3.0	-4.1	0.0		0.0	1.3	38.0	0.0	0.0	0.0	38.0
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	10.08	-31.1	3.0	-4.1	0.0		0.0	1.3	38.0		0.0		
Receiver houses rear Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 41 dB(A) LrN 36 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	7.07	-28.0	3.0	0.0	-0.1		0.0	3.2	35.6	0.0	0.0	0.0	35.6
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	7.07	-28.0	3.0	0.0	-0.1		0.0	3.2	35.6	0.0	0.0	0.0	35.6
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	8.66	-29.7	3.0	-3.1	0.0		0.0	1.0	40.0	0.0	0.0	0.0	40.0
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	8.66	-29.7	3.0	-3.1	0.0		0.0	1.0	40.0		0.0		
Receiver north of site site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 6 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	12.75	-33.1	3.0	-24.6	-0.2		0.0	3.8	6.5	0.0	0.0	0.0	6.5
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	12.75	-33.1	3.0	-24.6	-0.2		0.0	3.8	6.5	0.0	0.0	0.0	6.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	21.68	-37.7	3.0	-13.1	0.0		0.0	5.8	26.8	0.0	0.0	0.0	26.8
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	21.68	-37.7	3.0	-13.1	0.0		0.0	5.8	26.8		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 44 dB(A) LrN 36 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	6.21	-26.9	3.0	0.0	-0.1		0.0	1.9	35.5	0.0	0.0	0.0	35.5

Constitution Street
Mean propagation Leq - scenario 1

Source	Source type	Time slice	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	6.21	-26.9	3.0	0.0	-0.1		0.0	1.9	35.5	0.0	0.0	0.0	35.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	6.57	-27.3	3.0	-3.0	0.0		0.0	1.6	43.2	0.0	0.0	0.0	43.2
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	6.57	-27.3	3.0	-3.0	0.0		0.0	1.6	43.2		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 46 dB(A) LrN 34 dB(A)																					
~~aircon unit - Facade 01~~	~~Area~~	~~LrD~~	~~62.7~~	~~57.5~~	~~0.3~~	~~0.0~~	~~0.0~~	~~0~~	~~8.86~~	~~-29.9~~	~~3.0~~	~~0.0~~	~~-0.1~~		~~0.0~~	~~3.7~~	~~34.2~~	~~0.0~~	~~0.0~~	~~0.0~~	~~34.2~~
~~aircon unit - Facade 01~~	~~Area~~	~~LrN~~	~~62.7~~	~~57.5~~	~~0.3~~	~~0.0~~	~~0.0~~	~~0~~	~~8.86~~	~~-29.9~~	~~3.0~~	~~0.0~~	~~-0.1~~		~~0.0~~	~~3.7~~	~~34.2~~	~~0.0~~	~~0.0~~	~~0.0~~	~~34.2~~
~~LEV~~	~~Area~~	~~LrD~~	~~80.6~~	~~68.9~~	~~0.1~~	~~0.0~~	~~0.0~~	~~0~~	~~4.15~~	~~-23.4~~	~~3.0~~	~~-3.2~~	~~0.0~~		~~0.0~~	~~0.8~~	~~46.1~~	~~0.0~~	~~0.0~~	~~0.0~~	~~46.1~~
~~LEV~~	~~Area~~	~~LrN~~	~~80.6~~	~~68.9~~	~~0.1~~	~~0.0~~	~~0.0~~	~~0~~	~~4.15~~	~~-23.4~~	~~3.0~~	~~-3.2~~	~~0.0~~		~~0.0~~	~~0.8~~	~~46.1~~		~~0.0~~		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 28 dB(A) LrN 8 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.68	-30.7	3.0	-24.5	-0.1		0.0	3.0	8.3	0.0	0.0	0.0	8.3
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.68	-30.7	3.0	-24.5	-0.1		0.0	3.0	8.3	0.0	0.0	0.0	8.3
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	16.72	-35.5	3.0	-13.7	0.0		0.0	5.1	27.9	0.0	0.0	0.0	27.9
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	16.72	-35.5	3.0	-13.7	0.0		0.0	5.1	27.9		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 30 dB(A) LrN 7 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	10.55	-31.5	3.0	-24.5	-0.1		0.0	2.3	6.7	0.0	0.0	0.0	6.7
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	10.55	-31.5	3.0	-24.5	-0.1		0.0	2.3	6.7	0.0	0.0	0.0	6.7
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	9.86	-30.9	3.0	-14.4	0.0		0.0	3.1	29.8	0.0	0.0	0.0	29.8
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	9.86	-30.9	3.0	-14.4	0.0		0.0	3.1	29.8		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 7 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	12.81	-33.1	3.0	-24.5	-0.2		0.0	4.3	7.0	0.0	0.0	0.0	7.0
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	12.81	-33.1	3.0	-24.5	-0.2		0.0	4.3	7.0	0.0	0.0	0.0	7.0
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	8.34	-29.4	3.0	-14.4	0.0		0.0	1.0	29.1	0.0	0.0	0.0	29.1
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	8.34	-29.4	3.0	-14.4	0.0		0.0	1.0	29.1		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 8 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	10.98	-31.8	3.0	-24.5	-0.1		0.0	3.5	7.5	0.0	0.0	0.0	7.5
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	10.98	-31.8	3.0	-24.5	-0.1		0.0	3.5	7.5	0.0	0.0	0.0	7.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	19.17	-36.6	3.0	-13.4	0.0		0.0	5.4	27.3	0.0	0.0	0.0	27.3
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	19.17	-36.6	3.0	-13.4	0.0		0.0	5.4	27.3		0.0		
Receiver site 1st floor archway back Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 43 dB(A) LrN 39 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	3.78	-22.5	3.0	0.0	-0.1		0.0	0.8	38.7	0.0	0.0	0.0	38.7
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	3.78	-22.5	3.0	0.0	-0.1		0.0	0.8	38.7	0.0	0.0	0.0	38.7

Constitution Street
Mean propagation Leq - scenario 1

Source	Source type	Time slice	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)	
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	9.74	-30.8	3.0	-2.7	0.0		0.0	2.9	41.2	0.0	0.0	0.0	41.2	
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	9.74	-30.8	3.0	-2.7	0.0		0.0	2.9	41.2		0.0			
Receiver site 1st floor archway front Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 8 dB(A)																						
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.15	-30.2	3.0	-24.5	-0.1		0.0	2.5	8.2	0.0	0.0	0.0	8.2	
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.15	-30.2	3.0	-24.5	-0.1		0.0	2.5	8.2	0.0	0.0	0.0	8.2	
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	12.49	-32.9	3.0	-14.1	0.0		0.0	3.9	28.8	0.0	0.0	0.0	28.8	
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	12.49	-32.9	3.0	-14.1	0.0		0.0	3.9	28.8		0.0			
Receiver south of site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 5 dB(A)																						
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	19.90	-37.0	3.0	-24.6	-0.2		0.0	6.6	5.3	0.0	0.0	0.0	5.3	
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	19.90	-37.0	3.0	-24.6	-0.2		0.0	6.6	5.3	0.0	0.0	0.0	5.3	
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	10.47	-31.4	3.0	-14.4	0.0		0.0	2.8	29.0	0.0	0.0	0.0	29.0	
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	10.47	-31.4	3.0	-14.4	0.0		0.0	2.8	29.0		0.0			

Constitution Street
Octave spectra of the sources in dB(A) - scenario 1

Name	Source type	X m	Y m	Z m	l or A m,m²	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	DO-Wall dB	Time histogram	Emission spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)
aircon unit - Facade 01	Area	327175	676208	9.8	0.30	62.7	57.5	0.0	0.0		0	100%/24h	Con Street Heat exchanger	27.0	40.2	41.8	47.3	52.4	53.6	47.4	41.0
LEV	Area	327170	676197	15.8	0.07	80.6	68.9	0.0	0.0		0	cooler	Con Street LEV	54.3	54.9	59.1	64.4	64.3	57.9	53.0	46.6

Constitution Street
Run info
"Scenario 2.sit"

Project description

Project title:	Constitution Street
Project No.:	AS 0792
Project engineer:	Jack
Customer:	

Description:
Noise impact assessment for change of use.

Run description

Calculation type:	Single Point Sound
Title:	"Scenario 2.sit"
Group	
Run file:	RunFile.runx
Result number:	5
Local calculation (ThreadCount=12)	
Calculation start:	12/04/2021 16:00:19
Calculation end:	12/04/2021 16:00:23
Calculation time:	00:03:416 [m:s:ms]
No. of points:	14
No. of calculated points:	14
Kernel version:	SoundPLAN 8.2 (07/10/2020) - 32 bit

Run parameters

Reflection order:	3	
Maximum reflection distance to receiver		200 m
Maximum reflection distance to source		50 m
Search radius	5000 m	
Weighting:	dB(A)	
Allowed tolerance (per individual source):		0.100 dB
Create ground effect areas from road surfaces:		No

Standards:

Road:	CoRTN: 1988	
Driving on right side		
Emission according to:	CoRTN	
Reflection order limited to:	1	
Road gradient smoothed with smooth length of:		15 m
Disable low flow correction: No		
Method for L10 to Leq conversion: TRL formula		
Side diffraction: disabled		
Attenuation		
Foliage:	No attenuation	
Built-up area:	No attenuation	
Industrial site:	No attenuation	
Industry:	ISO 9613-2: 1996	

Air absorption: ISO 9613-1
regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect
Limitation of screening loss:
single/multiple 20.0 dB /25.0 dB
Side diffraction: Outdated method (side paths also around terrain)
Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
Environment:
Air pressure 1013.3 mbar
rel. humidity 70.0 %
Temperature 10.0 °C
Meteo. corr. C0(7-23h)[dB]=0.0; C0(23-7h)[dB]=0.0;
Ignore Cmet for Lmax industry calculation: No
Parameter for screening: C2=20.0
Dissection parameters:
Distance to diameter factor 8
Minimal distance 1 m
Max. difference ground effect + diffraction 1.0 dB
Max. number of iterations 4
Attenuation
Foliage: ISO 9613-2
Built-up area: ISO 9613-2
Industrial site: ISO 9613-2

Assessment: PPG24 (day/night)
Reflection of "own" facade is suppressed

Geometry data

Scenario 2.sit 23/02/2021 15:23:58
- contains:
calc area.geo 16/11/2020 20:47:00
existing buildings.geo 23/02/2021 15:23:18
Geo-File1.geo 10/11/2020 23:47:24
ground conditions.geo 12/04/2021 15:07:34
mastermap.geo 23/02/2021 13:49:48
receptors.geo 12/04/2021 15:20:12
roads.geo 23/02/2021 15:20:16
trams.geo 12/04/2021 15:09:06
RDGM0001.dgm 10/11/2020 23:45:52

Constitution Street
Assessed receiver levels
"Scenario 2.sit"

RNo	Receiver	Usage	Fl	Dir	X m	Y m	Z m	LrD dB(A)
1	94 constitution street	SCR	GF	SW	327180	676223	8.8	34.1
			F 1				11.3	35.7
			F 2				13.8	37.9
2	100 - west of site courtyard	SCR	GF	SE	327174	676214	9.4	35.7
			F 1				11.9	37.2
			F 2				14.4	39.7
			F 3				16.9	43.9
3	102-104 constitution street	SCR	GF	NE	327168	676201	9.2	36.6
			F 1				11.7	38.4
4	houses rear	SCR	GF	SE	327169	676205	9.2	36.2
			F 1				11.7	37.9
5	north of site site 1st floor	SCR	GF	SE	327187	676212	13.1	57.8
6	site 1st floor	SCR	GF	NW	327172	676203	13.1	39.0
7	site 1st floor	SCR	GF	NW	327171	676201	13.1	39.0
8	site 1st floor	SCR	GF	SE	327184	676207	13.1	57.9
9	site 1st floor	SCR	GF	SE	327180	676199	13.1	57.4
10	site 1st floor	SCR	GF	SE	327178	676196	13.1	57.4
11	site 1st floor	SCR	GF	SE	327185	676209	13.1	57.9
12	site 1st floor archway back	SCR	GF	NW	327174	676206	13.1	38.9
13	site 1st floor archway front	SCR	GF	SE	327182	676202	13.1	57.8
14	south of site 1st floor	SCR	GF	SE	327174	676188	13.1	57.7

Constitution Street
Assessed receiver spectra in dB(A) - "Scenario 2.sit"

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver 94 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 34.1 dB(A) LrN 27.7 dB(A)									
LrD	22.3	22.5	20.9	32.1	24.8	21.1	14.4	0.3	-21.7
LrN	19.3	19.5	17.9	20.6	21.8	18.1	11.4	-2.7	-24.7
Receiver 94 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 35.7 dB(A) LrN 28.3 dB(A)									
LrD	23.7	23.9	22.1	34.1	24.6	20.7	14.0	0.0	-21.9
LrN	20.7	20.9	19.1	21.1	21.6	17.7	11.0	-3.0	-24.9
Receiver 94 constitution street Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 37.9 dB(A) LrN 30.2 dB(A)									
LrD	25.9	26.4	24.7	36.5	25.6	20.7	13.7	-0.3	-22.3
LrN	22.9	23.4	21.7	23.4	22.6	17.7	10.7	-3.3	-25.3
Receiver 100 - west of site courtyard Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 35.7 dB(A) LrN 29.4 dB(A)									
LrD	24.2	25.1	22.8	33.7	26.1	22.2	15.5	1.6	-20.5
LrN	21.2	22.1	19.8	22.1	23.1	19.2	12.5	-1.4	-23.5
Receiver 100 - west of site courtyard Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 37.2 dB(A) LrN 29.8 dB(A)									
LrD	25.9	26.1	23.8	35.6	25.5	21.3	14.7	0.6	-21.5
LrN	22.9	23.1	20.8	22.4	22.5	18.3	11.7	-2.4	-24.5
Receiver 100 - west of site courtyard Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 39.7 dB(A) LrN 32.2 dB(A)									
LrD	28.4	28.9	26.9	38.3	27.0	21.4	14.2	0.2	-21.9
LrN	25.4	25.9	23.9	25.3	24.0	18.4	11.2	-2.8	-24.9
Receiver 100 - west of site courtyard Fl F 3 LrD,lim dB(A) LrN,lim dB(A) LrD 43.9 dB(A) LrN 38.0 dB(A)									
LrD	29.9	31.4	32.1	42.0	35.7	30.2	22.1	6.3	-17.9
LrN	26.9	28.4	29.1	32.5	32.7	27.2	19.1	3.3	-20.9
Receiver 102-104 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 36.6 dB(A) LrN 30.9 dB(A)									
LrD	26.3	27.0	24.6	34.1	27.3	23.4	16.8	2.8	-19.5
LrN	23.3	24.0	21.6	23.3	24.3	20.4	13.8	-0.2	-22.5
Receiver 102-104 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 38.4 dB(A) LrN 32.1 dB(A)									
LrD	28.0	28.8	26.6	36.4	27.3	23.1	16.5	2.5	-19.8
LrN	25.0	25.8	23.6	24.7	24.3	20.1	13.5	-0.5	-22.8
Receiver houses rear Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 36.2 dB(A) LrN 29.7 dB(A)									
LrD	24.9	25.7	23.6	34.3	25.9	22.1	15.5	1.1	-21.6
LrN	21.9	22.7	20.6	22.2	22.9	19.1	12.5	-1.9	-24.6
Receiver houses rear Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 37.9 dB(A) LrN 30.7 dB(A)									
LrD	26.4	27.4	25.2	36.3	25.8	21.6	14.9	0.7	-21.9
LrN	23.4	24.4	22.2	23.4	22.8	18.6	11.9	-2.3	-24.9
Receiver north of site site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.8 dB(A) LrN 51.0 dB(A)									
LrD	37.9	40.8	43.2	56.2	49.8	46.4	40.5	28.0	8.9
LrN	34.9	37.8	40.2	45.0	46.8	43.4	37.5	25.0	5.9
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 39.0 dB(A) LrN 32.1 dB(A)									
LrD	28.1	28.8	26.7	37.3	27.0	22.4	15.7	1.7	-20.2
LrN	25.1	25.8	23.7	24.8	24.0	19.4	12.7	-1.3	-23.2

Constitution Street
Assessed receiver spectra in dB(A) - "Scenario 2.sit"

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 39.0 dB(A) LrN 31.9 dB(A)									
LrD	28.1	28.7	26.6	37.3	26.7	22.3	15.6	1.6	-20.3
LrN	25.1	25.7	23.6	24.7	23.7	19.3	12.6	-1.4	-23.3
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.9 dB(A) LrN 51.0 dB(A)									
LrD	37.8	40.8	43.2	56.3	49.8	46.4	40.4	27.9	8.9
LrN	34.8	37.8	40.2	45.0	46.8	43.4	37.4	24.9	5.9
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.4 dB(A) LrN 50.5 dB(A)									
LrD	37.4	40.2	42.4	55.9	49.4	45.6	39.5	27.4	8.5
LrN	34.4	37.2	39.4	44.6	46.4	42.6	36.5	24.4	5.5
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.4 dB(A) LrN 50.5 dB(A)									
LrD	37.4	40.2	42.4	55.8	49.4	45.6	39.6	27.5	8.6
LrN	34.4	37.2	39.4	44.6	46.4	42.6	36.6	24.5	5.6
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.9 dB(A) LrN 51.0 dB(A)									
LrD	37.8	40.8	43.2	56.3	49.8	46.4	40.5	28.0	8.9
LrN	34.8	37.8	40.2	45.0	46.8	43.4	37.5	25.0	5.9
Receiver site 1st floor archway back Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 38.9 dB(A) LrN 32.0 dB(A)									
LrD	27.9	28.5	26.7	37.2	27.2	22.5	15.7	1.7	-20.2
LrN	24.9	25.5	23.7	25.0	24.2	19.5	12.7	-1.3	-23.2
Receiver site 1st floor archway front Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.8 dB(A) LrN 50.9 dB(A)									
LrD	37.7	40.7	43.0	56.2	49.7	46.2	40.3	27.9	8.9
LrN	34.7	37.7	40.0	44.9	46.7	43.2	37.3	24.9	5.9
Receiver south of site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.7 dB(A) LrN 50.8 dB(A)									
LrD	37.4	40.4	42.9	56.1	49.7	46.0	40.3	27.9	8.9
LrN	34.4	37.4	39.9	44.9	46.7	43.0	37.3	24.9	5.9

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li	R'w	L'w	Lw	l or A	KI	KT	Ko	S	Adiv	Agr	Abar	Aatm	Amisc	ADI	dLrefl	Ls	dLw	Cmet	ZR	Lr
			dB(A)	dB	dB(A)	dB(A)	m,m²	dB	dB	dB	m	dB	dB	dB	dB	dB	dB	dB	dB(A)	dB	dB	dB	dB(A)
Receiver 94 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 34.1 dB(A) LrN 27.7 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	36.60	-42.3	2.5	-22.7	-0.1		0.0	3.3	-22.5	50.0	0.0	0.0	27.5
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	36.60	-42.3	2.5	-22.7	-0.1		0.0	3.3	-22.5	47.0	0.0	0.0	24.5
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	33.14	-41.4	2.6	-23.0	-0.1		0.0	2.8	-22.2	50.0	0.0	0.0	27.8
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	33.14	-41.4	2.6	-23.0	-0.1		0.0	2.8	-22.2	47.0	0.0	0.0	24.8
Constitution Street	Road	LrD					180.8											0.0					31.5
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 94 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 35.7 dB(A) LrN 28.3 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	36.92	-42.3	2.5	-21.7	-0.1		0.0	3.0	-21.8	50.0	0.0	0.0	28.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	36.92	-42.3	2.5	-21.7	-0.1		0.0	3.0	-21.8	47.0	0.0	0.0	25.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	33.54	-41.5	2.5	-22.2	-0.1		0.0	2.7	-21.7	50.0	0.0	0.0	28.3
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	33.54	-41.5	2.5	-22.2	-0.1		0.0	2.7	-21.7	47.0	0.0	0.0	25.3
Constitution Street	Road	LrD					180.8											0.0					33.7
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 94 constitution street Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 37.9 dB(A) LrN 30.2 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	37.56	-42.5	2.5	-19.7	-0.1		0.0	3.1	-19.8	50.0	0.0	0.0	30.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	37.56	-42.5	2.5	-19.7	-0.1		0.0	3.1	-19.8	47.0	0.0	0.0	27.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	34.32	-41.7	2.5	-20.5	-0.1		0.0	3.0	-19.9	50.0	0.0	0.0	30.1
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	34.32	-41.7	2.5	-20.5	-0.1		0.0	3.0	-19.9	47.0	0.0	0.0	27.1
Constitution Street	Road	LrD					180.8											0.0					36.1
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 100 - west of site courtyard Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 35.7 dB(A) LrN 29.4 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	38.13	-42.6	2.6	-22.3	-0.1		0.0	4.8	-20.8	50.0	0.0	0.0	29.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	38.13	-42.6	2.6	-22.3	-0.1		0.0	4.8	-20.8	47.0	0.0	0.0	26.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	34.64	-41.8	2.7	-22.5	-0.1		0.0	4.4	-20.5	50.0	0.0	0.0	29.5
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	34.64	-41.8	2.7	-22.5	-0.1		0.0	4.4	-20.5	47.0	0.0	0.0	26.5

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li	R'w	L'w	Lw	l or A	KI	KT	Ko	S	Adiv	Agr	Abar	Aatm	Amisc	ADI	dLrefl	Ls	dLw	Cmet	ZR	Lr
			dB(A)	dB	dB(A)	dB(A)	m,m²	dB	dB	dB	m	dB	dB	dB	dB	dB	dB	dB	dB(A)	dB	dB	dB	dB(A)
Constitution Street	Road	LrD					180.8											0.0					33.0
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 100 - west of site courtyard Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 37.2 dB(A) LrN 29.8 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	38.49	-42.7	2.6	-21.1	-0.1		0.0	4.2	-20.2	50.0	0.0	0.0	29.8
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	38.49	-42.7	2.6	-21.1	-0.1		0.0	4.2	-20.2	47.0	0.0	0.0	26.8
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	35.07	-41.9	2.7	-21.5	-0.1		0.0	3.8	-20.1	50.0	0.0	0.0	29.9
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	35.07	-41.9	2.7	-21.5	-0.1		0.0	3.8	-20.1	47.0	0.0	0.0	26.9
Constitution Street	Road	LrD					180.8											0.0					35.2
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 100 - west of site courtyard Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 39.7 dB(A) LrN 32.2 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	39.15	-42.8	2.6	-18.5	0.0		0.0	4.2	-17.7	50.0	0.0	0.0	32.3
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	39.15	-42.8	2.6	-18.5	0.0		0.0	4.2	-17.7	47.0	0.0	0.0	29.3
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	35.87	-42.1	2.6	-19.4	-0.1		0.0	4.2	-17.9	50.0	0.0	0.0	32.1
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	35.87	-42.1	2.6	-19.4	-0.1		0.0	4.2	-17.9	47.0	0.0	0.0	29.1
Constitution Street	Road	LrD					180.8											0.0					37.8
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 100 - west of site courtyard Fl F 3 LrD,lim dB(A) LrN,lim dB(A) LrD 43.9 dB(A) LrN 38.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	40.07	-43.0	2.6	-13.5	-0.1		0.0	5.2	-12.0	50.0	0.0	0.0	38.0
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	40.07	-43.0	2.6	-13.5	-0.1		0.0	5.2	-12.0	47.0	0.0	0.0	35.0
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	36.97	-42.3	2.6	-15.1	-0.1		0.0	5.9	-12.1	50.0	0.0	0.0	37.9
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	36.97	-42.3	2.6	-15.1	-0.1		0.0	5.9	-12.1	47.0	0.0	0.0	34.9
Constitution Street	Road	LrD					180.8											0.0					40.8
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 102-104 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 36.6 dB(A) LrN 30.9 dB(A)																							

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li	R'w	L'w	Lw	l or A	KI	KT	Ko	S	Adiv	Agr	Abar	Aatm	Amisc	ADI	dLrefl	Ls	dLw	Cmet	ZR	Lr
			dB(A)	dB	dB(A)	dB(A)	m,m²	dB	dB	dB	m	dB	dB	dB	dB	dB	dB	dB	dB(A)	dB	dB	dB	dB(A)
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	37.79	-42.5	2.8	-21.9	-0.1		0.0	5.7	-19.2	50.0	0.0	0.0	30.8
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	37.79	-42.5	2.8	-21.9	-0.1		0.0	5.7	-19.2	47.0	0.0	0.0	27.8
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	34.03	-41.6	2.8	-22.2	-0.1		0.0	5.3	-19.0	50.0	0.0	0.0	31.0
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	34.03	-41.6	2.8	-22.2	-0.1		0.0	5.3	-19.0	47.0	0.0	0.0	28.0
Constitution Street	Road	LrD					180.8											0.0					33.3
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 102-104 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 38.4 dB(A) LrN 32.1 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	38.14	-42.6	2.7	-20.4	-0.1		0.0	5.6	-17.9	50.0	0.0	0.0	32.1
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	38.14	-42.6	2.7	-20.4	-0.1		0.0	5.6	-17.9	47.0	0.0	0.0	29.1
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	34.45	-41.7	2.8	-21.0	-0.1		0.0	5.3	-17.9	50.0	0.0	0.0	32.1
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	34.45	-41.7	2.8	-21.0	-0.1		0.0	5.3	-17.9	47.0	0.0	0.0	29.1
Constitution Street	Road	LrD					180.8											0.0					35.7
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver houses rear Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 36.2 dB(A) LrN 29.7 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	39.43	-42.9	2.7	-21.5	-0.1		0.0	4.4	-20.5	50.0	0.0	0.0	29.5
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	39.43	-42.9	2.7	-21.5	-0.1		0.0	4.4	-20.5	47.0	0.0	0.0	26.5
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	35.82	-42.1	2.8	-21.8	-0.1		0.0	4.1	-20.3	50.0	0.0	0.0	29.7
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	35.82	-42.1	2.8	-21.8	-0.1		0.0	4.1	-20.3	47.0	0.0	0.0	26.7
Constitution Street	Road	LrD					180.8											0.0					33.7
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver houses rear Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 37.9 dB(A) LrN 30.7 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	39.75	-43.0	2.7	-20.0	-0.1		0.0	4.2	-19.3	50.0	0.0	0.0	30.7
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	39.75	-43.0	2.7	-20.0	-0.1		0.0	4.2	-19.3	47.0	0.0	0.0	27.7
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	36.20	-42.2	2.7	-20.6	-0.1		0.0	3.9	-19.3	50.0	0.0	0.0	30.7
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	36.20	-42.2	2.7	-20.6	-0.1		0.0	3.9	-19.3	47.0	0.0	0.0	27.7
Constitution Street	Road	LrD					180.8											0.0					35.8

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li	R'w	L'w	Lw	l or A	KI	KT	Ko	S	Adiv	Agr	Abar	Aatm	Amisc	ADI	dLrefl	Ls	dLw	Cmet	ZR	Lr
			dB(A)	dB	dB(A)	dB(A)	m,m²	dB	dB	dB	m	dB	dB	dB	dB	dB	dB	dB	dB(A)	dB	dB	dB	dB(A)
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver north of site site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.8 dB(A) LrN 51.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.59	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.6	50.0	0.0	0.0	51.6
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.59	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.6	47.0	0.0	0.0	48.6
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	21.96	-37.8	2.8	-3.3	-0.1		0.0	2.0	0.4	50.0	0.0	0.0	50.4
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	21.96	-37.8	2.8	-3.3	-0.1		0.0	2.0	0.4	47.0	0.0	0.0	47.4
Constitution Street	Road	LrD					180.8											0.0					55.5
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 39.0 dB(A) LrN 32.1 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	36.07	-42.1	2.7	-20.1	-0.1		0.0	4.7	-18.0	50.0	0.0	0.0	32.0
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	36.07	-42.1	2.7	-20.1	-0.1		0.0	4.7	-18.0	47.0	0.0	0.0	29.0
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	32.47	-41.2	2.8	-20.6	0.0		0.0	4.3	-18.0	50.0	0.0	0.0	32.0
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	32.47	-41.2	2.8	-20.6	0.0		0.0	4.3	-18.0	47.0	0.0	0.0	29.0
Constitution Street	Road	LrD					180.8											0.0					36.8
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 39.0 dB(A) LrN 31.9 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	36.20	-42.2	2.8	-19.9	0.0		0.0	4.4	-18.1	50.0	0.0	0.0	31.9
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	36.20	-42.2	2.8	-19.9	0.0		0.0	4.4	-18.1	47.0	0.0	0.0	28.9
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	32.55	-41.2	2.8	-20.5	0.0		0.0	4.1	-18.0	50.0	0.0	0.0	32.0
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	32.55	-41.2	2.8	-20.5	0.0		0.0	4.1	-18.0	47.0	0.0	0.0	29.0
Constitution Street	Road	LrD					180.8											0.0					36.8
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.9 dB(A) LrN 51.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.69	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.5	50.0	0.0	0.0	51.5

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li	R'w	L'w	Lw	l or A	KI	KT	Ko	S	Adiv	Agr	Abar	Aatm	Amisc	ADI	dLrefl	Ls	dLw	Cmet	ZR	Lr
			dB(A)	dB	dB(A)	dB(A)	m,m²	dB	dB	dB	m	dB	dB	dB	dB	dB	dB	dB	dB(A)	dB	dB	dB	dB(A)
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.69	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.5	47.0	0.0	0.0	48.5
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	21.99	-37.8	2.9	-3.3	-0.1		0.0	1.9	0.4	50.0	0.0	0.0	50.5
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	21.99	-37.8	2.9	-3.3	-0.1		0.0	1.9	0.4	47.0	0.0	0.0	47.5
Constitution Street	Road	LrD					180.8											0.0					55.6
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.4 dB(A) LrN 50.5 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.91	-39.3	2.9	-0.8	-0.1		0.0	1.7	1.2	50.0	0.0	0.0	51.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.91	-39.3	2.9	-0.8	-0.1		0.0	1.7	1.2	47.0	0.0	0.0	48.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	22.10	-37.9	2.9	-4.4	-0.1		0.0	2.2	-0.4	50.0	0.0	0.0	49.6
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	22.10	-37.9	2.9	-4.4	-0.1		0.0	2.2	-0.4	47.0	0.0	0.0	46.6
Constitution Street	Road	LrD					180.8											0.0					55.2
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.4 dB(A) LrN 50.5 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	26.03	-39.3	2.9	-0.9	-0.1		0.0	1.7	1.1	50.0	0.0	0.0	51.1
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	26.03	-39.3	2.9	-0.9	-0.1		0.0	1.7	1.1	47.0	0.0	0.0	48.1
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	22.17	-37.9	2.9	-4.3	-0.1		0.0	2.2	-0.3	50.0	0.0	0.0	49.7
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	22.17	-37.9	2.9	-4.3	-0.1		0.0	2.2	-0.3	47.0	0.0	0.0	46.7
Constitution Street	Road	LrD					180.8											0.0					55.1
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.9 dB(A) LrN 51.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.64	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.5	50.0	0.0	0.0	51.5
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.64	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.5	47.0	0.0	0.0	48.5
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	21.97	-37.8	2.9	-3.3	-0.1		0.0	2.0	0.5	50.0	0.0	0.0	50.5
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	21.97	-37.8	2.9	-3.3	-0.1		0.0	2.0	0.5	47.0	0.0	0.0	47.5
Constitution Street	Road	LrD					180.8											0.0					55.5
Constitution Street	Road	LrN					180.8											0.0					

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li	R'w	L'w	Lw	l or A	KI	KT	Ko	S	Adiv	Agr	Abar	Aatm	Amisc	ADI	dLrefl	Ls	dLw	Cmet	ZR	Lr
			dB(A)	dB	dB(A)	dB(A)	m,m²	dB	dB	dB	m	dB	dB	dB	dB	dB	dB	dB	dB(A)	dB	dB	dB	dB(A)
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor archway back Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 38.9 dB(A) LrN 32.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	35.95	-42.1	2.7	-20.2	-0.1		0.0	4.8	-18.0	50.0	0.0	0.0	32.0
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	35.95	-42.1	2.7	-20.2	-0.1		0.0	4.8	-18.0	47.0	0.0	0.0	29.0
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	32.41	-41.2	2.8	-20.7	0.0		0.0	4.4	-18.0	50.0	0.0	0.0	32.0
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	32.41	-41.2	2.8	-20.7	0.0		0.0	4.4	-18.0	47.0	0.0	0.0	29.0
Constitution Street	Road	LrD					180.8											0.0					36.7
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor archway front Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.8 dB(A) LrN 50.9 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.80	-39.2	2.8	-0.6	-0.1		0.0	1.7	1.4	50.0	0.0	0.0	51.4
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.80	-39.2	2.8	-0.6	-0.1		0.0	1.7	1.4	47.0	0.0	0.0	48.4
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	22.04	-37.9	2.9	-3.5	-0.1		0.0	2.0	0.2	50.0	0.0	0.0	50.2
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	22.04	-37.9	2.9	-3.5	-0.1		0.0	2.0	0.2	47.0	0.0	0.0	47.2
Constitution Street	Road	LrD					180.8											0.0					55.5
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver south of site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.7 dB(A) LrN 50.8 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	26.42	-39.4	2.9	-0.7	-0.1		0.0	1.7	1.2	50.0	0.0	0.0	51.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	26.42	-39.4	2.9	-0.7	-0.1		0.0	1.7	1.2	47.0	0.0	0.0	48.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	22.29	-38.0	2.9	-3.1	-0.1		0.0	1.8	0.4	50.0	0.0	0.0	50.4
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	22.29	-38.0	2.9	-3.1	-0.1		0.0	1.8	0.4	47.0	0.0	0.0	47.4
Constitution Street	Road	LrD					180.8											0.0					55.4
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																

Constitution Street
Octave spectra of the sources in dB(A) - "Scenario 2.sit"

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
tram North to South	Line	180.16			14.3	36.8	0.0	0.0		0	trams	trams	23.4	25.7	26.6	30.8	32.3	28.4	22.5	11.2	-5.2
tram South to North	Line	180.95			14.3	36.8	0.0	0.0		0	trams	trams	23.5	25.7	26.6	30.8	32.3	28.4	22.5	11.2	-5.2

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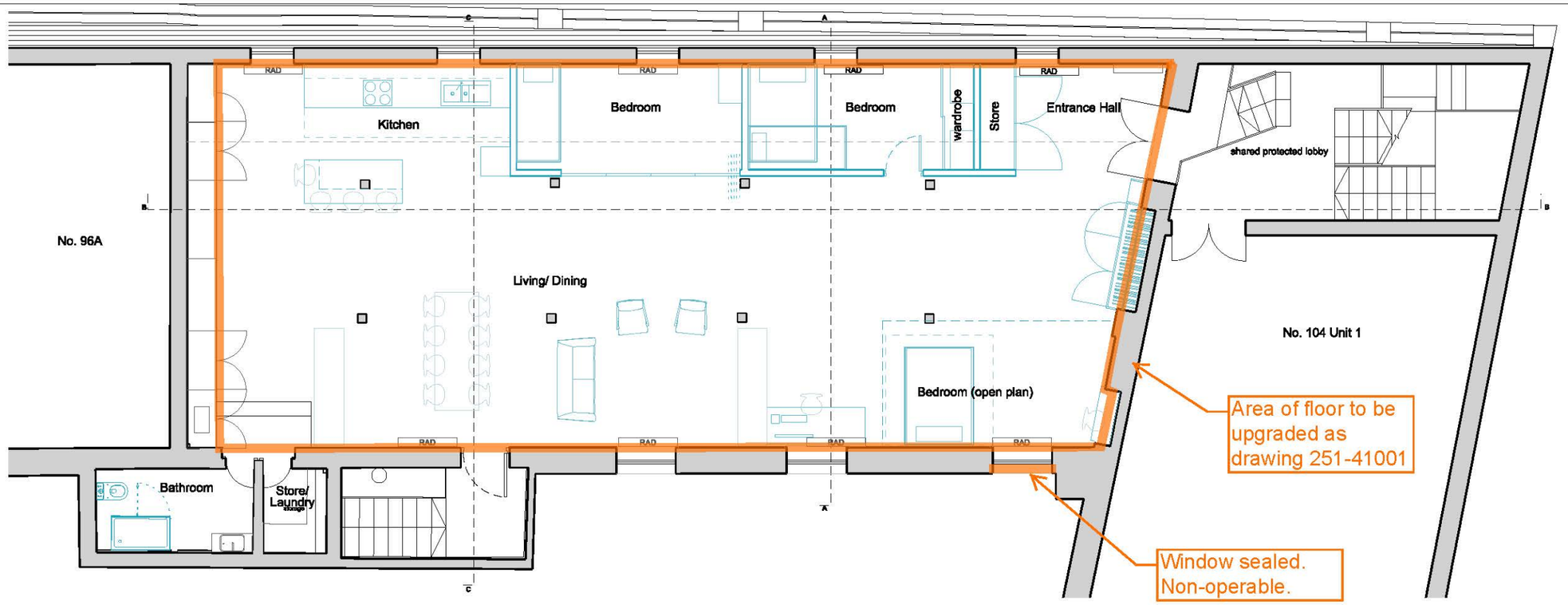
30 April 2021

Local Review Documents List

20/05447/FUL Notice of Review

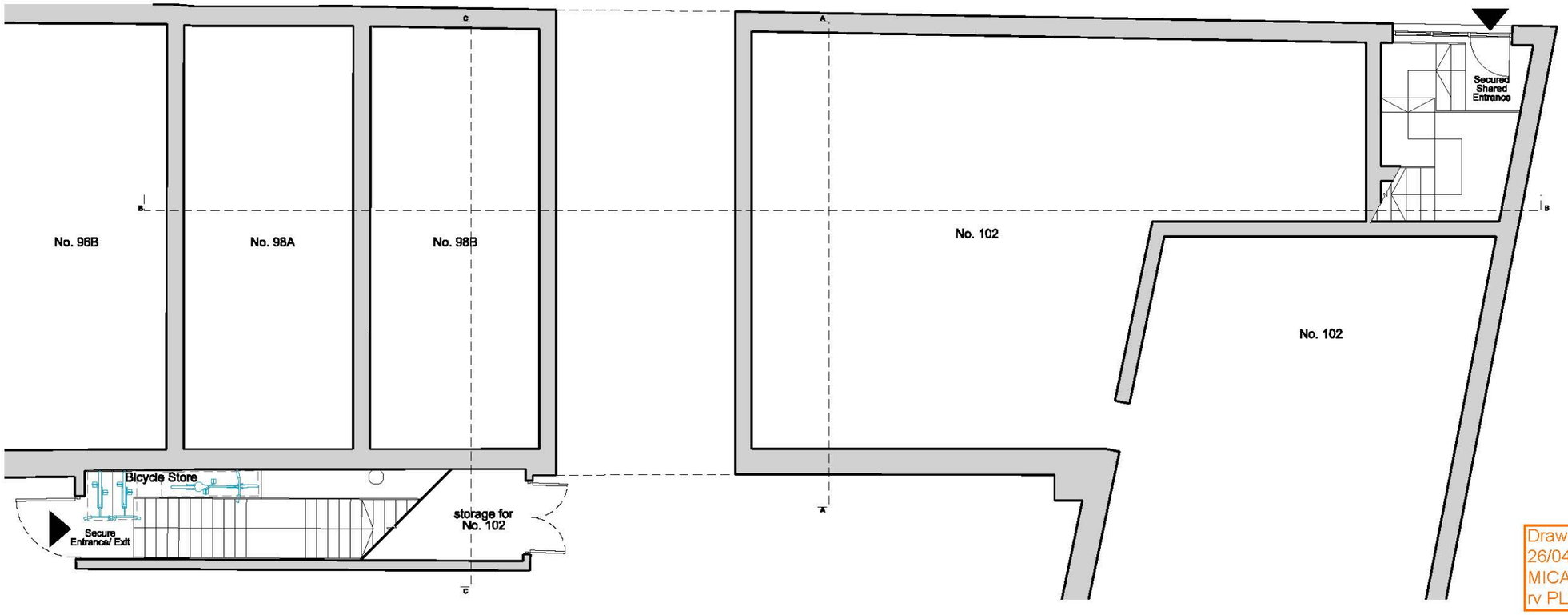
104 Constitution Street, Edinburgh

Doc No.	Title
1	Local Review Statement
2	Design Statement (dated 26/04/2021)
3	Email to Alan Moonie
4	Noise Impact Assessment (revision 10)
5	251-19200-PL2 (drawing mark-up 26/04/2021, revision PL2), Proposed Ground & First Floor Plan
6	251-19210-PL2 (drawing mark-up 26/04/2021, revision PL2), Proposed Sections A, B & C
7	251-19220-PL2 (drawing mark-up 26/04/2021, revision PL2), Proposed East & West Elevations
8	251-41000-PL1, Existing Wall and Floor Section
9	251-41001-PL1, Proposed Wall and Floor Section



First Floor Plan

02	251-19200



Ground Floor Plan

01	251-19200

Drawing Mark-up
26/04/2021
MICA Architects
rv PL2

NOTES
- ☐ Proposed
- ☐ Existing

REVISIONS

REV	DATE	DESCRIPTION
P1	04.12.20	FOR INFORMATION

0 1 2 3 4 5m

JOB
HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

MICA

PLANNING

TITLE
Ground & First Floor Plans
PROPOSED

DRG # **251-MICA-PL-00-DR-A-19200** REV **PL1**

CHECKED	DRAWN	SCALE	SIZE	REV DATE
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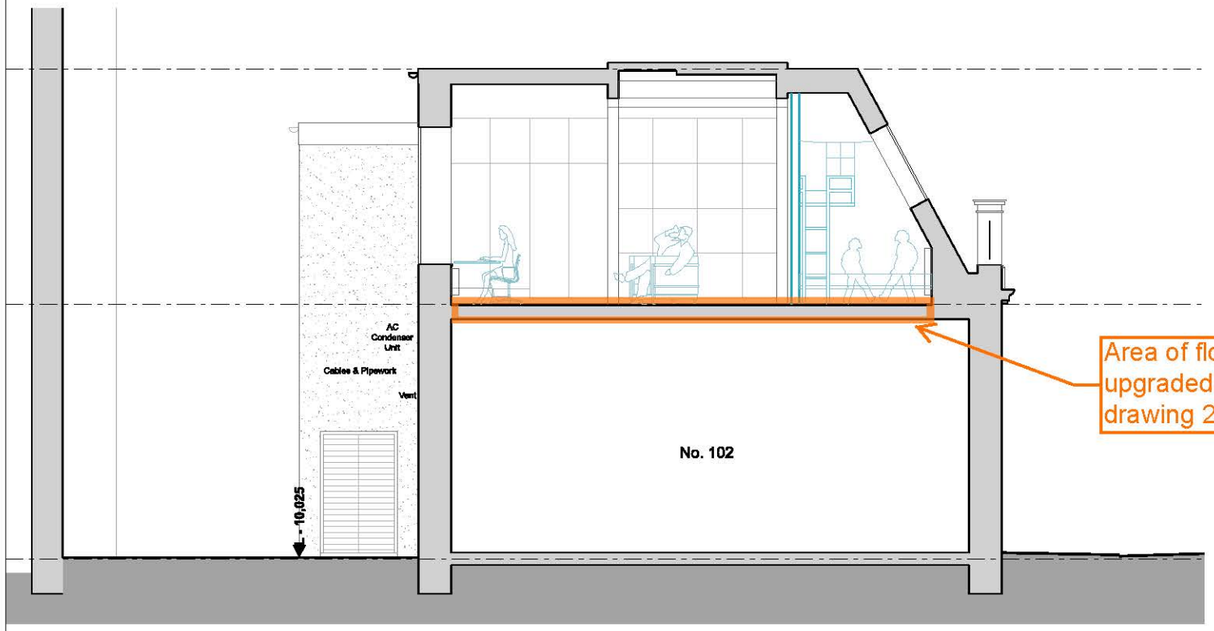
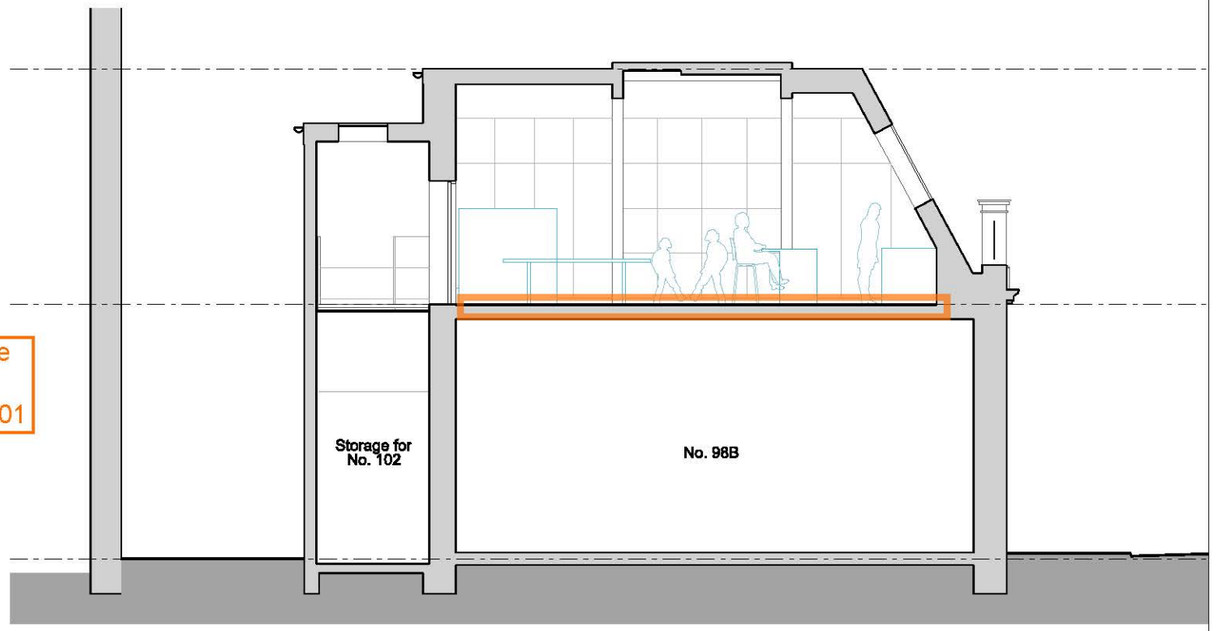


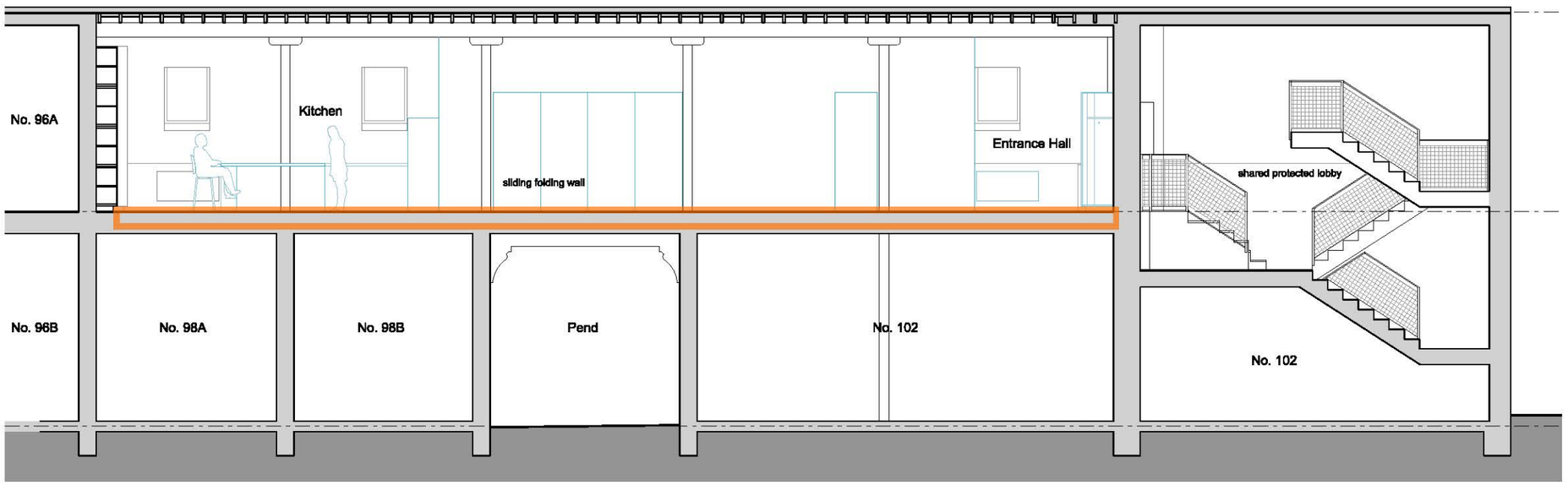
Section AA

01	251-19210



Section CC

03	251-19210



Section BB

02	251-19210

Drawing Mark-up
26/04/2021
MICA Architects
rv PL2

NOTES
☐ Proposed
☐ Existing

REVISIONS

REV	DATE	DESCRIPTION
PL1	04.12.20	PLANNING

0 1 2 3 4 5m

PLANNING

JOB
HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

MICA

TITLE
Section A-A, B-B, & C-C
PROPOSED

DRG.# **251-MICA-PL-00-DR-A-19210** REV **PL1**

CHECKED	DRAWN	SCALE	SIZE	REV DATE
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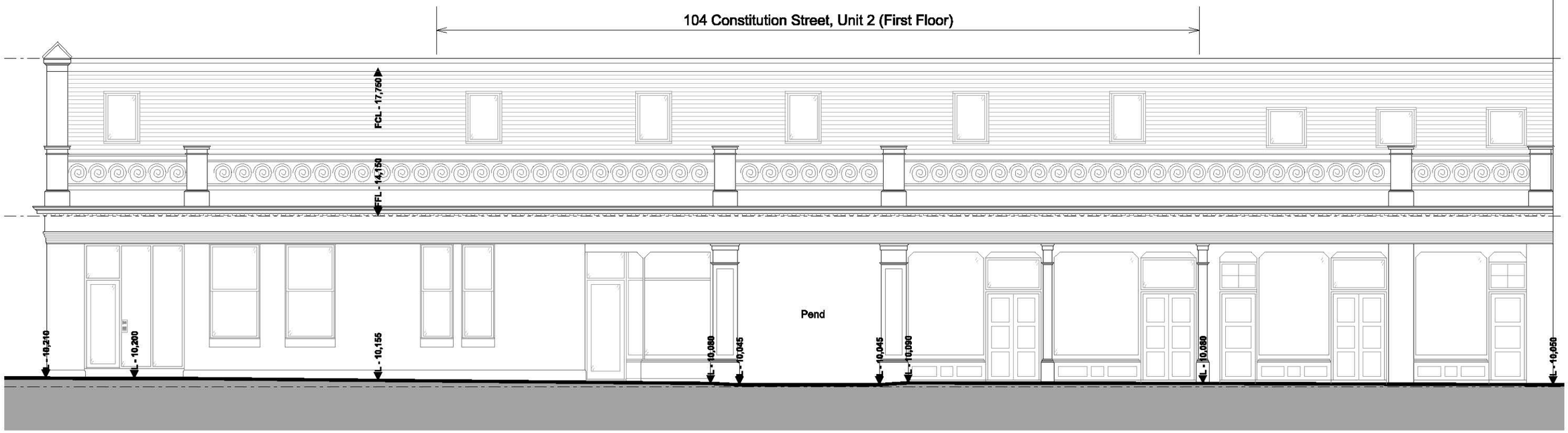
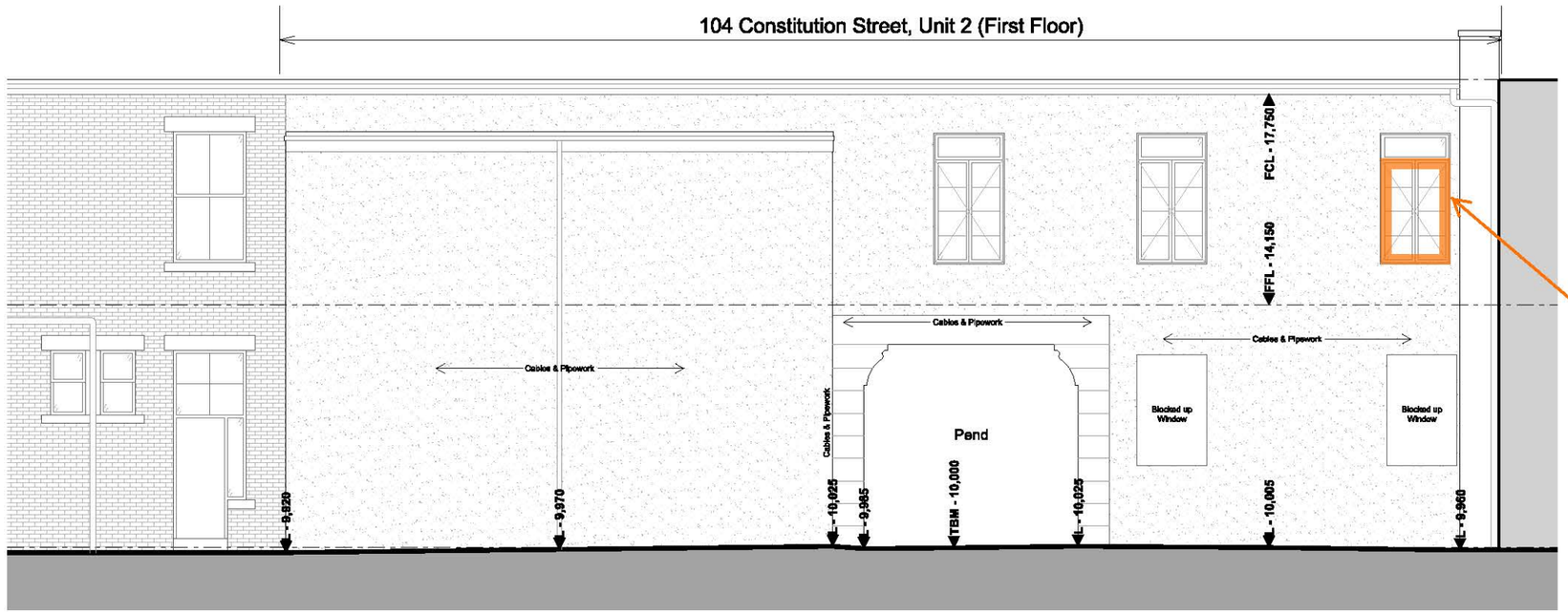


East Elevation

01	251-19220



West Elevation

02	251-19220

Drawing Mark-up
26/04/2021
MICA Architects
rv PL2

NOTES
- ☐ Proposed
- ☐ Existing

REVISIONS

REV	DATE	DESCRIPTION
PL1	04.12.20	PLANNING

0 1 2 3 4 5m

JOB
HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

MICA

PLANNING

TITLE
East & West Elevations
PROPOSED

DRG # **251-MICA-PL-00-DR-A-19220** REV **PL1**

CHECKED	DRAWN	SCALE	SIZE	REV DATE
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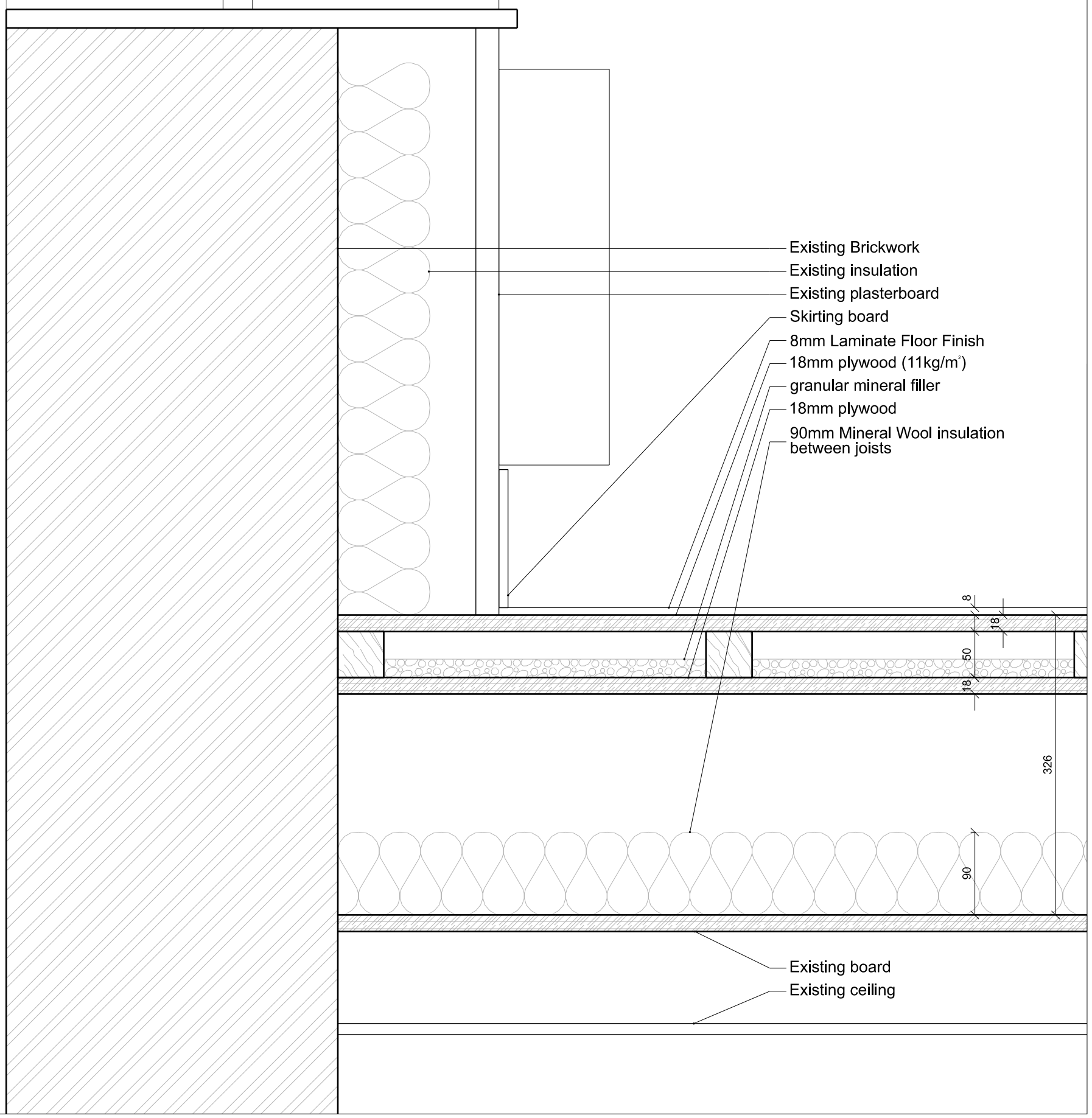


DO NOT SCALE FROM THIS DRAWING. CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE.
ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

PRELIMINARY

NOTES

REVISIONS

REV	DATE	DESCRIPTION
PL1	26.04.21	PLANNING

JOB **HOGARTH LOFT**
104 CONSTITUTION STREET, EH6 6AW

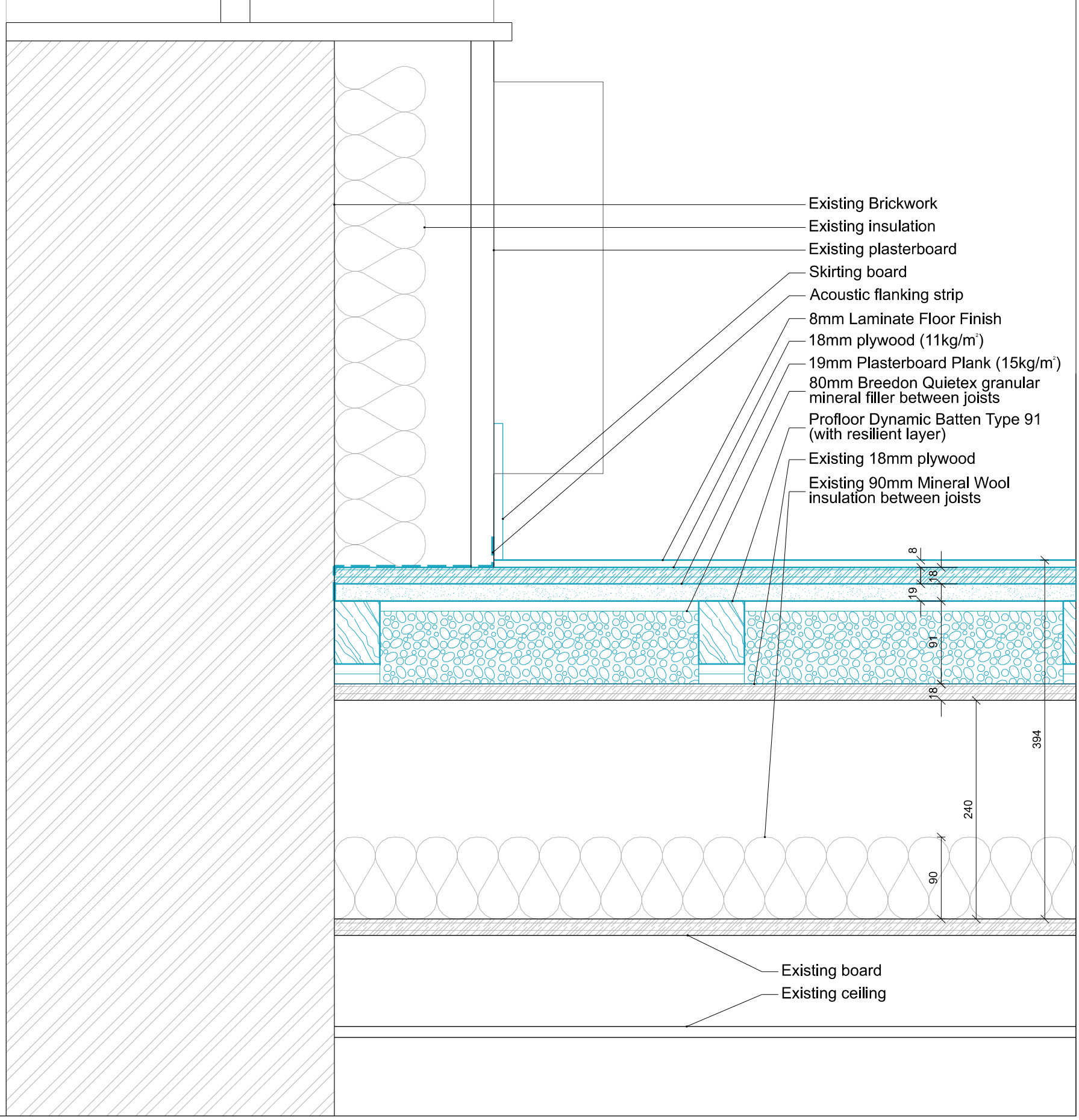
MICA
123 Camden High Street London NW1 7JR
T: 020 7284 1727 F: 020 7267 7826
Info@micaarchitects.com www.micaarchitects.com

TITLE **EXISTING EXTERNAL SECTION DETAIL**
Wall and Floor

DRG # **251-MICA-XX-01-DR-A-41000** REV PL1

CHECKED	DRAWN	SCALE	SIZE	REV DATE
PM	KO	1:5	A3	26/04/21

41001



DO NOT SCALE FROM THIS DRAWING. CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE.
ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

PRELIMINARY

NOTES

REVISIONS

REV	DATE	DESCRIPTION
PL1	26.04.21	PLANNING

JOB **HOGARTH LOFT**
104 CONSTITUTION STREET, EH6 6AW

MICA
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TITLE **PROPOSED EXTERNAL SECTION DETAIL**
Wall and Floor

DRG # **251-MICA-XX-01-DR-A-41001** REV PL1

CHECKED	DRAWN	SCALE	SIZE	REV DATE
PM	KO	1:5	A3	26/04/21

Jenny Hogarth
124 Brunton Gardens
Montgomery Street
Edinburgh
EH7 5ET

By e-mail

Dear Jenny

Environmental Noise from Chop House
Affecting Proposed Dwelling at 104 Constitution Street, Leith

I refer to the above project, which proposes a change of use from office to residential at Unit 2, 104 Constitution Street, Edinburgh EH6 6AS [Pre-application Reference No. 20/03771/PREAPP] and your instruction to conduct an environmental noise impact assessment for the scheme. The site location is shown in Figure 1. This letter report was updated to take account of the comments made by the City of Edinburgh Environmental Health by email to the applicant's architect on 20th April 2021 and a subsequent follow-up email on 26th April 2021. I have further amended the report to take account of additional information which was provided to CEC Environmental Health by email on 14th July 2021, relating to additional calculations and alterations to the proposed floor specification.

I understand that you are currently seeking planning permission to change the use of the 1st floor office into a single 'loft-style' residential apartment. Further details of the project are presented in Appendix 1. The City of Edinburgh's Environmental Protection has advised that you will need to submit a noise impact assessment to consider the impact from the Chop House restaurant. The main potential noise impacts from the Chop House are likely to arise from amplified music, kitchen noise and noise from fixed plant. This noise impact assessment has been updated to take account of CEC's requirements. The measurements were conducted in accordance with a protocol agreed with CEC. Further details of the measured levels are presented in Appendix 2.1. This report includes the results from additional surveys at the site to quantify noise from fixed plant and includes predictions for tram and other transport activities within Constitution Street.

Noise transmission through ceiling / floor structure to proposed apartment

We have conducted measurements of noise in the downstairs restaurant, where the average noise was 76 dB $LA_{eq,\ 10\ minutes}$, with peak noise levels of up to 86 dB LA_{max}. From discussions with the restaurant's management, we believe that this is likely to be pessimistic in terms of normal operational practice at the restaurant.[1] The simultaneous average noise level measured in the upstairs apartment was 38 dB $LA_{eq\ 10\ minutes}$. The measured levels in the apartment are likely to be significantly affected by background ambient sound from other extraneous sources. Our estimate of background ambient

[1] This test was conducted to allow an assessment of music noise in the upstairs apartment to enable a comparison to NR15 (the standard CEC test for inaudibility) and does not constitute a test in accordance with the more exacting requirements of BS EN ISO 140-4 Acoustics - Measurement of sound insulation in buildings and of building elements – Part 4: Field measurements of airborne sound insulation between rooms.

sound in the apartment (windows closed, all restaurant activity off) is ~37 dB $LA_{eq\ 10\ minutes}$. All measurements included 1/3rd octave band measurements, which indicate the relative performance of the floor across the range of frequencies between 20Hz – 20kHz. Thus, the floor achieves ~30 dB attenuation at 125Hz, ~40 dB at mid-range frequencies (200 – 400Hz) and >50 dB at frequencies above 500Hz, not taking account of the contribution from ambient background sound. The average measured levels in the restaurant and apartment are plotted in Chart 1a at the end of the text. This includes the estimated background ambient sound from unrelated activities. The estimated attenuation provided by the intervening floor is presented in Chart 1b at the end of the text. The measured noise from music in the apartment is plotted in Chart 1c. This indicates that the music from the restaurant under the conditions of the test would exceed NR15 in the apartment by up to 16 dB at 125 Hz. [See details in Table 1]. The apartment was unfurnished at the time of the test and with hard reflecting surfaces and no absorbent surfaces. Even allowing for a less reverberant apartment and a reduced music level, it is likely that music from the restaurant would be audible in the upstairs apartment. This conclusion is consistent with the observations recorded by our survey technician, who noted that noise from music was clearly audible in the apartment under the conditions of the test and just audible at low frequencies when the music level in the restaurant was turned down to 'normal' levels. Based on the results of this survey, airborne noise transmission through the floor is inadequate at frequencies between 63Hz and 250Hz and additional attenuation is required for any reasonable prospect of the floor complying with CEC's requirements for inaudibility.

The project architect has confirmed the existing floor layout. [See detail in Appendix 1-1]. The existing floor has an estimated density of 89kg/m^2. [Table 1 in Appendix 1-3]. The theoretical sound attenuation properties for the existing floor based on its composition have been calculated and compared with the inaudibility criterion (NR15) as proposed by CEC. [See Table 1 in Appendix 1-2]. The calculations from Table 1 Appendix 1-1 agree well with the results from the measurements obtained by Airshed in February 2021, where the measured and predicted levels at 125 and 250Hz failed the NR15 test. The attenuation required to improve the floor performance is therefore substantial.

The calculations in Table 2 in Appendix 1-2 show that the floor detail as proposed by the project Architect in April 2021 [Drawing 251-MICA-XX-01-DR-A-41001 Proposed external section detail 26/04/21Rev PL1] would comply above the retail use on the ground floor. The results from the equivalent calculation above the restaurant would continue to exceed NR15 in the apartment [See Table 3 in Appendix 1-2]. This relates to the now superseded drawings.

The proposed design [July 2021] includes increased floor mass of the floor to >180kg/m^3 using a combination of dense granular material, mineral wool, plywood and plasterboard and a floating floor. The detail of the measures proposed to improve the sound attenuation of the floor between the restaurant and the apartment are shown in Appendix 1-1. [Drawing 251-MICA-XX-01-DR-A-41001 Proposed external section detail 27/07/2021Rev PL227,07.21 PL2].

All flooring panels shall be offset to minimise noise breakout. The joints of all panels shall be taped. The joints around the edges between the plasterboard and the walls shall be sealed with a resilient acoustic sealant. No holes shall be made in the flooring (e.g. by

drilling or cutting) for services. The floor detail shall include resilient strips at the walls and skirtings, to minimise flanking transmission. This robust detail is likely to significantly improve the performance of the floor. The calculations in Table 4 Appendix 1-2 show that this floor configuration would comply with NR15 above the restaurant.

Although the results from Table 2 in Appendix 1-2 confirm that the floor specification above the retail unit (as proposed in April 2021) would achieve NR15 in the apartment, the floating floor design as now proposed in Appendix 1-1 should be applied across the entire floor area to include both the restaurant and the retail uses, to avoid potential weaker pathway sound transmission that such different treatments could introduce.

Based on this approach the sound transmission from both the retail and restaurant uses is predicted to achieve NT15 in the proposed apartment.

Noise from Fixed Plant (Scenario 1)

Measurements were conducted close to the source of the restaurant's kitchen local exhaust ventilation (LEV) system, an air conditioning heat exchange condenser unit and the rear access to the restaurant kitchen door. Measurements were also obtained in the apartment with windows open and windows closed. The measured levels for the air conditioning condenser unit and the LEV are plotted in Charts 2 and 3 respectively, with no adjustment for extraneous noise from the ambient background. The measured levels are plotted and compared to NR25 in Chart 4. This shows that the measured levels from fixed plant inside the apartment, with windows open, exceed NR25. These measurements are significantly compromised by the contribution from the ambient background sound unrelated to the restaurant activity. The baseline ambient sound level during the course of the surveys was too variable to reliably determine the contribution from extraneous (unrelated) noise within the proposed apartment.

Accordingly, the source estimates have been used to predict the combined noise from fixed plant (LEV, condenser unit and breakout through kitchen door) using the procedure set out in ISO 9613[2] as implemented by SoundPlan 8.2 ® (Scenario 1). ISO 9613 specifies an engineering method for calculating the attenuation of sound to predict noise levels at a distance from a variety of sources. The method predicts the equivalent continuous A – weighted sound pressure level (LA_{eq}) under meteorological conditions favourable to propagation from sources of known sound emission.

ISO 9613 may be applied to the prediction of noise from industry and many other ground-based sources. This prediction technique is considered to be appropriate for the noise sources under consideration in this assessment. The model includes for geometrical divergence, atmospheric absorption, ground effects, reflection from surfaces, and screening by obstacles. The model allows for the use of correction factors for ground cover. For hard surfaces such as water or tarmac the correction is applied simply as 3 dB for all frequencies and distances. Where the ground cover is soft, such as grass, woodland, or other less reflective material, an empirical relationship between ground

[2] ISO 9613:1996 (E) Acoustics – Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere; and Part 2 : General method of calculation.

attenuation and frequency and distance may be used. Hard ground has been assumed across the study area.

These predictions assume downwind meteorological conditions which are favourable for noise propagation from the source to a receiver, where the predicted noise level is seldom exceeded. The estimated accuracy using this method is ±3 dBA. The estimate of error in the ISO Standard is based on situations where there are no effects of attenuation due to screening.

The proposed layout was obtained from drawings provided by the applicant. The detail of surrounding site receptors and ground conditions was obtained from a site centred OS map at scale 1:1250, OS Terrain 5 spot ground height levels and a site walkover. Variations in local ground heights were taken into account. A digital model of the ground and buildings was constructed. The model layout for fixed plant noise prediction (Scenario 1) is shown in Figure 2. The detailed results from this prediction are presented in Appendix 3.

The predicted combined noise from the fixed plant (based on the measurements close to source) are considered in prediction model Scenario 1. The predicted noise levels inside the apartment with windows open are presented in Table 2 and plotted in Chart 5. This Scenario assumes that the chiller unit may be operated on a 24-hour basis and that the kitchen LEV does not operate at night, after 23:00 hours. This Scenario assumes that the apartment window closet to the LEV is a sealed unit. The project architect has confirmed that there is sufficient ventilation within the apartment if this window is not an opening window. The results from this Scenario indicate that the noise from fixed plant is predicted to comply with NR25 during both the daytime and at night.[3] This assumes a reduction of 15 dB through an open window. In considering the attenuation provided by windows, the latest WHO Guidance states: '*The differences between indoor and outdoor levels are usually estimated at around 10 dB for open, 15 dB for tilted or half-open and about 25 dB for closed windows.*'[4] Traditionally acousticians have used a value of 10 – 15 dBA based on the old WHO 1999 Community Noise Guidelines. The estimate of attenuation proposed in the WHO's latest Guidance is based on more recent research[5], which reflects improvements in standard window attenuation over the last two decades.

Noise from Tram and Road Traffic (Scenario 2)

There is currently no road traffic on Constitution Street, due to the preparatory construction works for the extension of the tram network. At the request of CEC, we have conducted an assessment of noise from running trams in Constitution Street based on a noise prediction model. Single event levels (SEL) for tram noise were obtained for free-flowing tram movements on North St Andrew's Street. The results from this survey are presented in Appendix 2.2.

The model setup and building configuration used for Scenario 1 have been adopted for assessing noise from transport. Noise from trams at the proposed apartment has been predicted based on these SEL values, assuming ten tram movements on each line

[3] The predicted noise levels at the proposed sealed window in Scenario 1 have been struck out in the model outputs presented in Appendix 3 (pages 74 – 79 inclusive in the pdf report) and have been discounted. The predicted external free-field noise levels at the worst-case opening window are highlighted in yellow.
[4] WHO 2018. Environmental Noise Guidelines for the European Region Section 2.2.2 page 9
[5] Barbara Locher et al. 2018. Differences between Outdoor and Indoor Sound Levels for Open, Tilted and Closed Windows. International Journal of Environmental Research and Public Health 2018 15,149. This reported a mean value of 16 dBA for tilted windows.

averaged over the sixteen hour day (07:00 – 23:00). Noise from the trams has been modelled as two line sources 0.5m above local ground level. The noise model layout is shown in Figure 3. The detailed model outputs are presented in Appendix 3,

Noise from road traffic has been predicted using DoT CRTN 1988, as implemented by SoundPlan 8.2. I have assumed that there will be up to 12 bus movements (as HGVs) and 50 taxi movements (as LDVs) on the road per hour, assuming a 20mph speed limit.

This indicates that the overall worst-case transport noise level at the most exposed window in the apartment would be 58 dB $LA_{eq\ 07:00\ –\ 23:00}$. Noise levels on the sheltered elevations are predicted to be <40 dB $LA_{eq\ 07:00\ –\ 23:00.}$ These predictions are free-field, outside. The contribution from transport noise at the most adversely affected (worst-case) receptor includes a substantial contribution from road traffic noise (56 dB $LA_{eq\ 07:00\ –\ 23:00}$), which is likely to be pessimistic. The detailed results for this Scenario are presented in Appendix 3.

The results from this assessment indicate that transport noise levels inside the proposed apartment are likely to comply with the requirements of BS 8233:2014 Table 4, assuming closed windows.

[redacted]

[redacted]

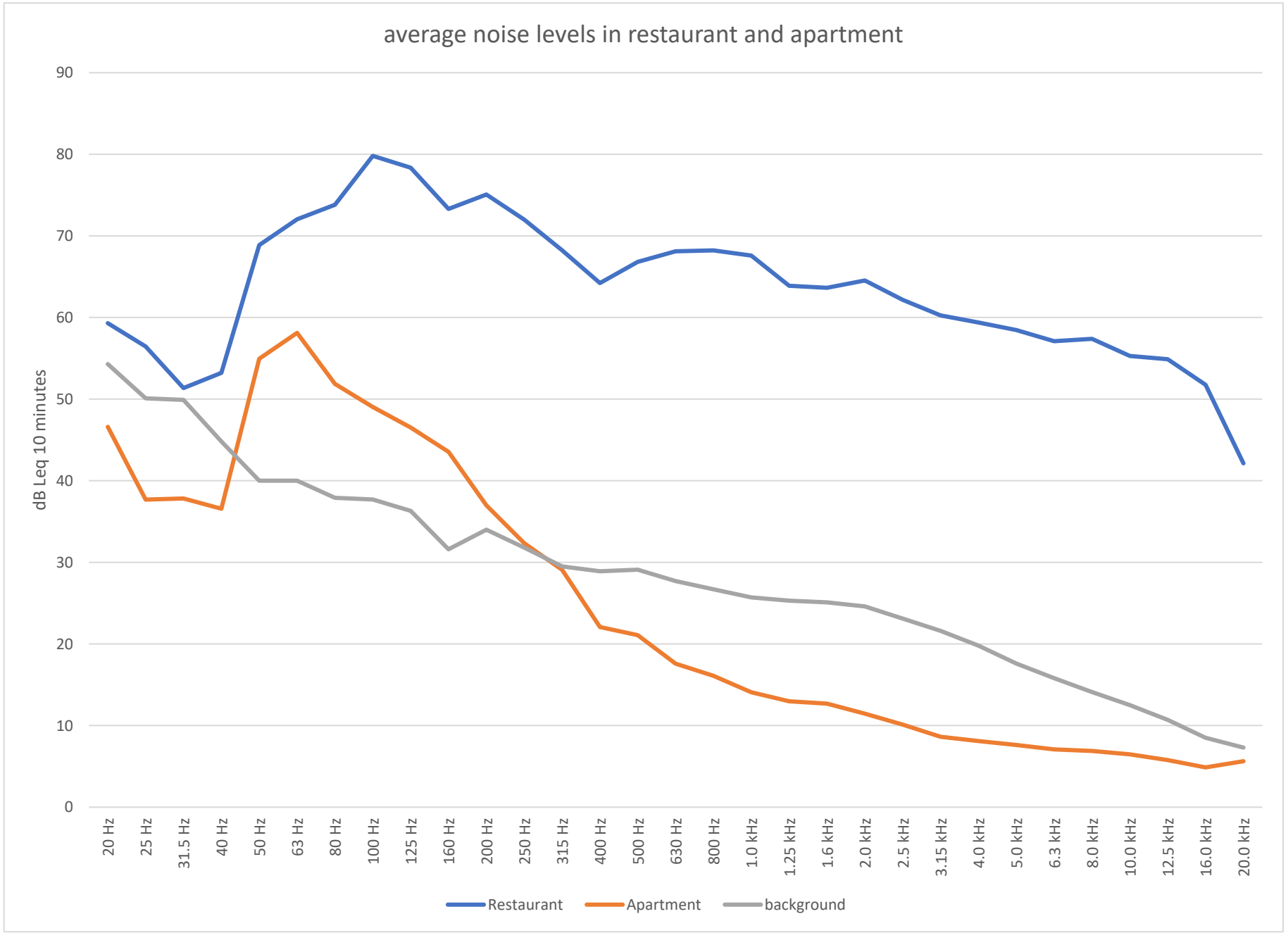
[redacted] *MIoA MCIWM*

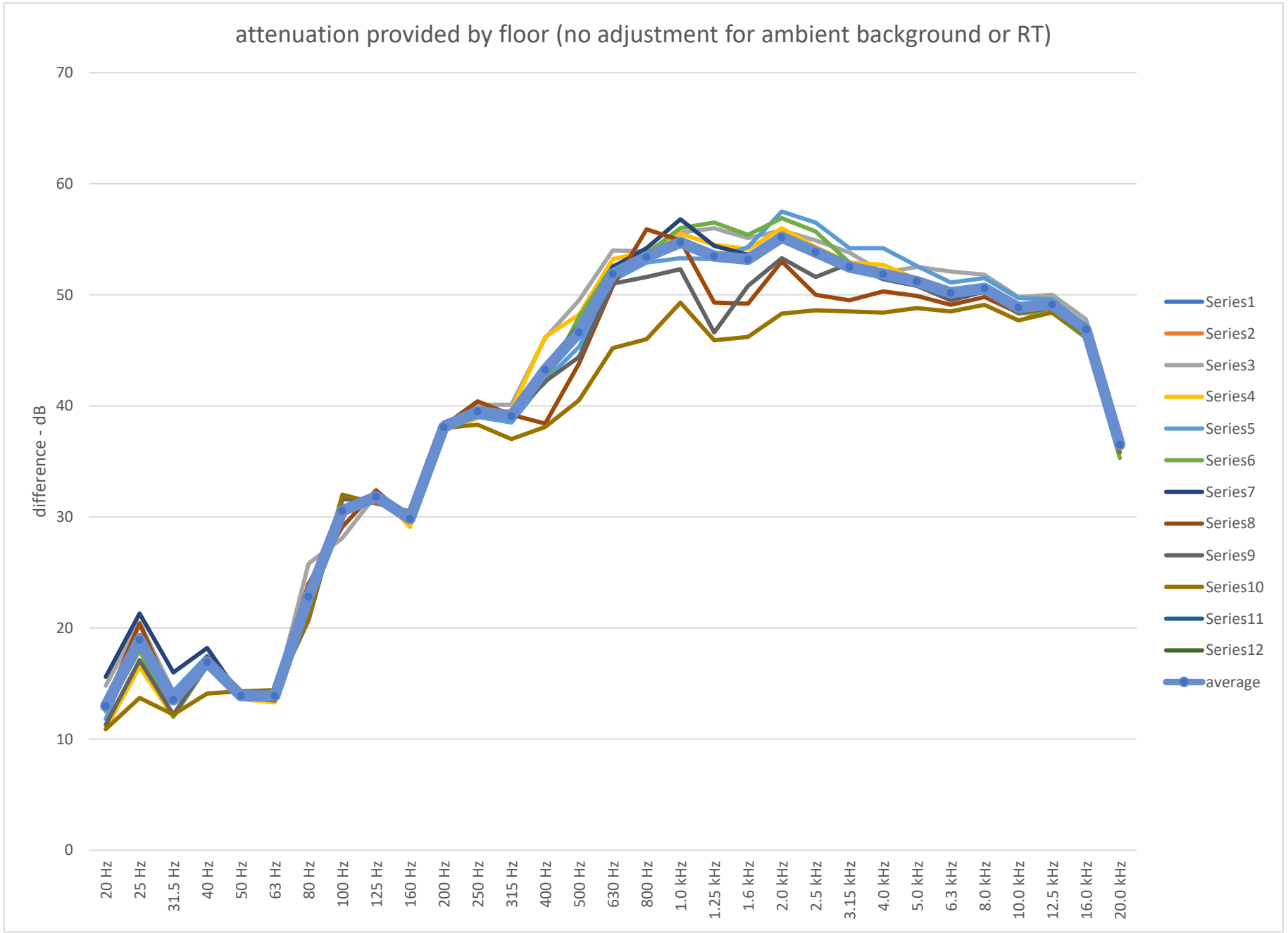
Tables

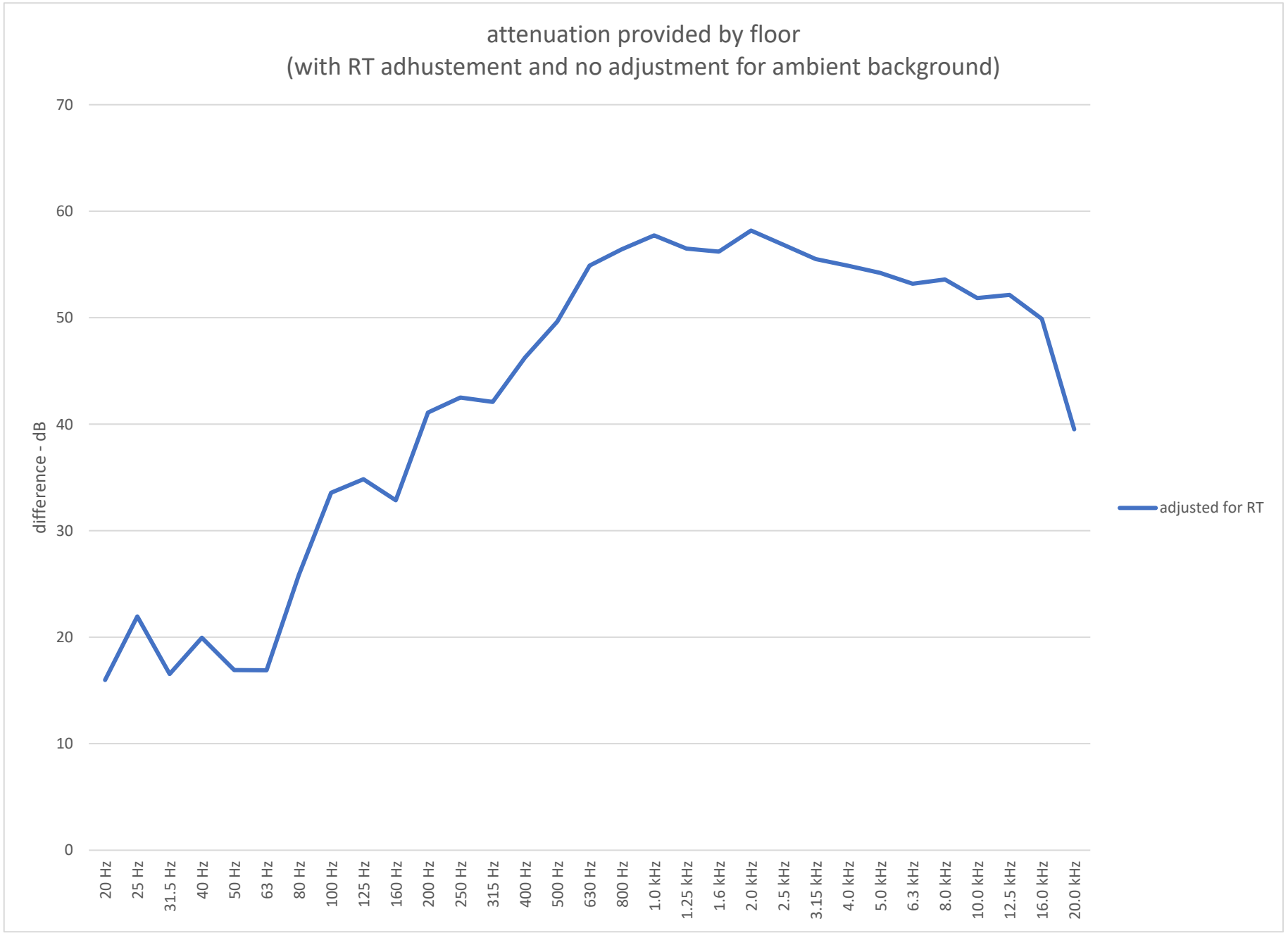
Description	Frequency (Hz)	31.5	63	125	250	500	1 000	2000	4000	8000
	units	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*	*dB*
	LEV inside (open window)	57	45	48	45	46	45	37	31	25
	heat exchanger (open window)	54	42	43	40	34	32	30	25	18
	music	48	60	52	39	25	19	16	13	12
	kitchen door	54	42	43	38	35	34	29	23	17
	music - background	0	60	51	34	0	0	0	0	0
measured levels	background	57	44	41	37	33	31	29	25	19
Noise Rating Curves from Table B1 BS 8233:2014	NR25	72.4	55.2	43.7	35.2	29.2	25	21.9	19.5	17.7
	NR15	65.6	47.3	35	25.9	19.4	15	11.7	9.3	7.4
Compliance (internal level - NR)	music (no adjustment for background)	-18	13	17	13	6	4	5	4	4
	music (with adjustment for background)	-66	13	16	8	-19	-15	-12	-9	-7

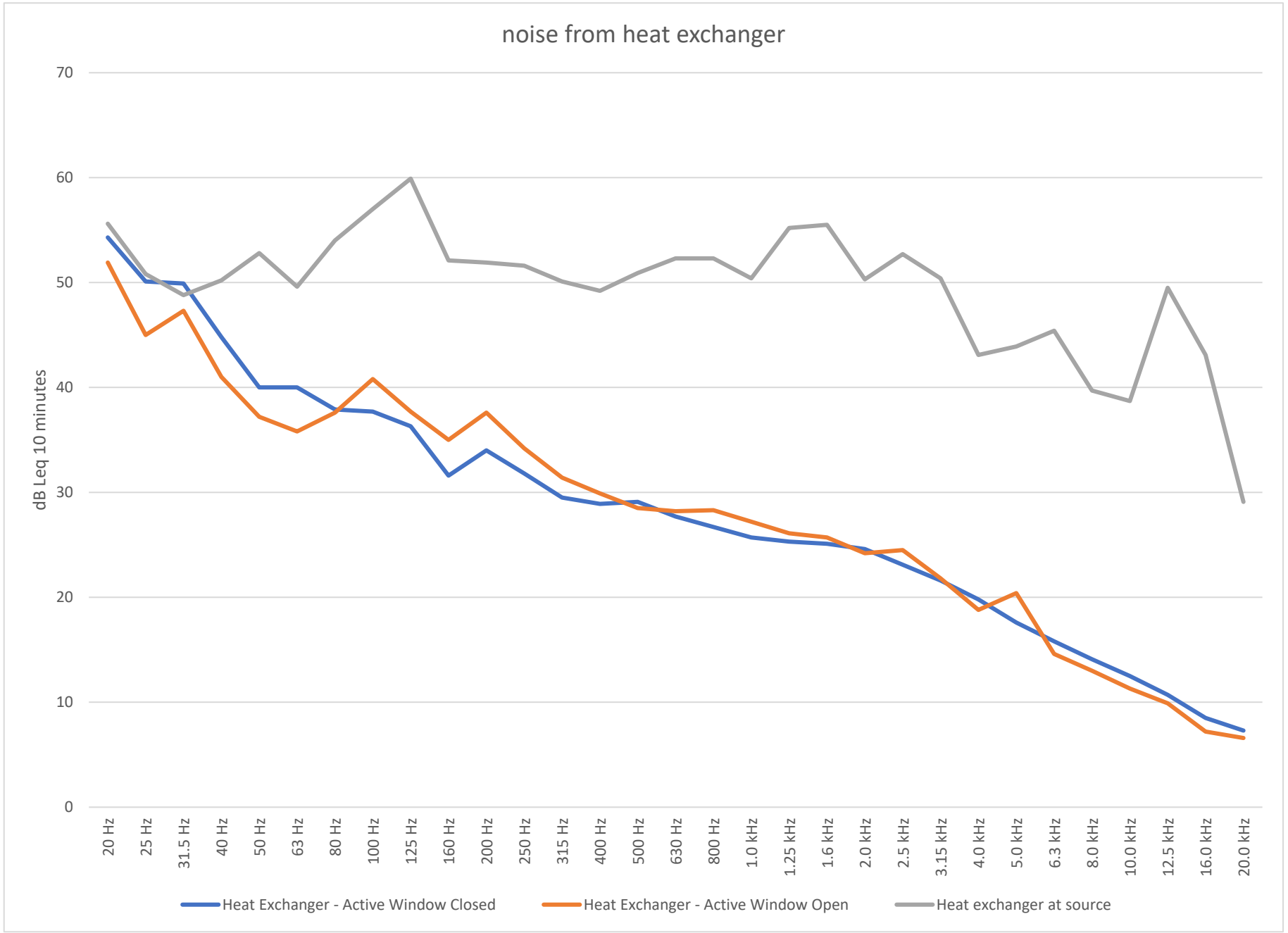
Description	Frequency (Hz)	125	250	500	1 000	2 000
	units	*dBA*	*dBA*	*dBA*	*dBA*	*dBA*
Noise model output - excluding worst case receptor	Predicted Noise Daytime (external)	30.6	33.6	38.8	39.1	34.5
	Predicted Noise Night-time (external)	18.1	19.6	24.9	29.7	30.8
from Table A.1 BS 8233:2014	correction dBA to dB	-16.1	-8.6	-3.2	0	1.2
	correction dBA to dB	-16.1	-8.6	-3.2	0	1.2
Corrected levels from dBA to to dB	Predicted Noise Daytime (external)	46.7	42.2	42	39.1	33.3
	Predicted Noise Night-time (external)	34.2	28.2	28.1	29.7	29.6
Assumes 15 dB reduction from outside to inside	Predicted Noise Daytime (inside)	31.7	27.2	27	24.1	18.3
	Predicted Noise Night-time (inside)	19.2	13.2	13.1	14.7	14.6
Noise Rating Curves from Table B1 BS 8233:2014	NR30 (daytime)	48.1	39.9	34	30	26.9
	NR25 (night-time)	43.7	35.2	29.2	25	21.9
Compliance (internal level - NR)	daytime	-16	-13	-7	-6	-9
	night-time	-25	-22	-16	-10	-7
Compliance (internal level - NR)	daytime	-12	-8	-2	-1	-4
	night-time	68	57	45	35	29

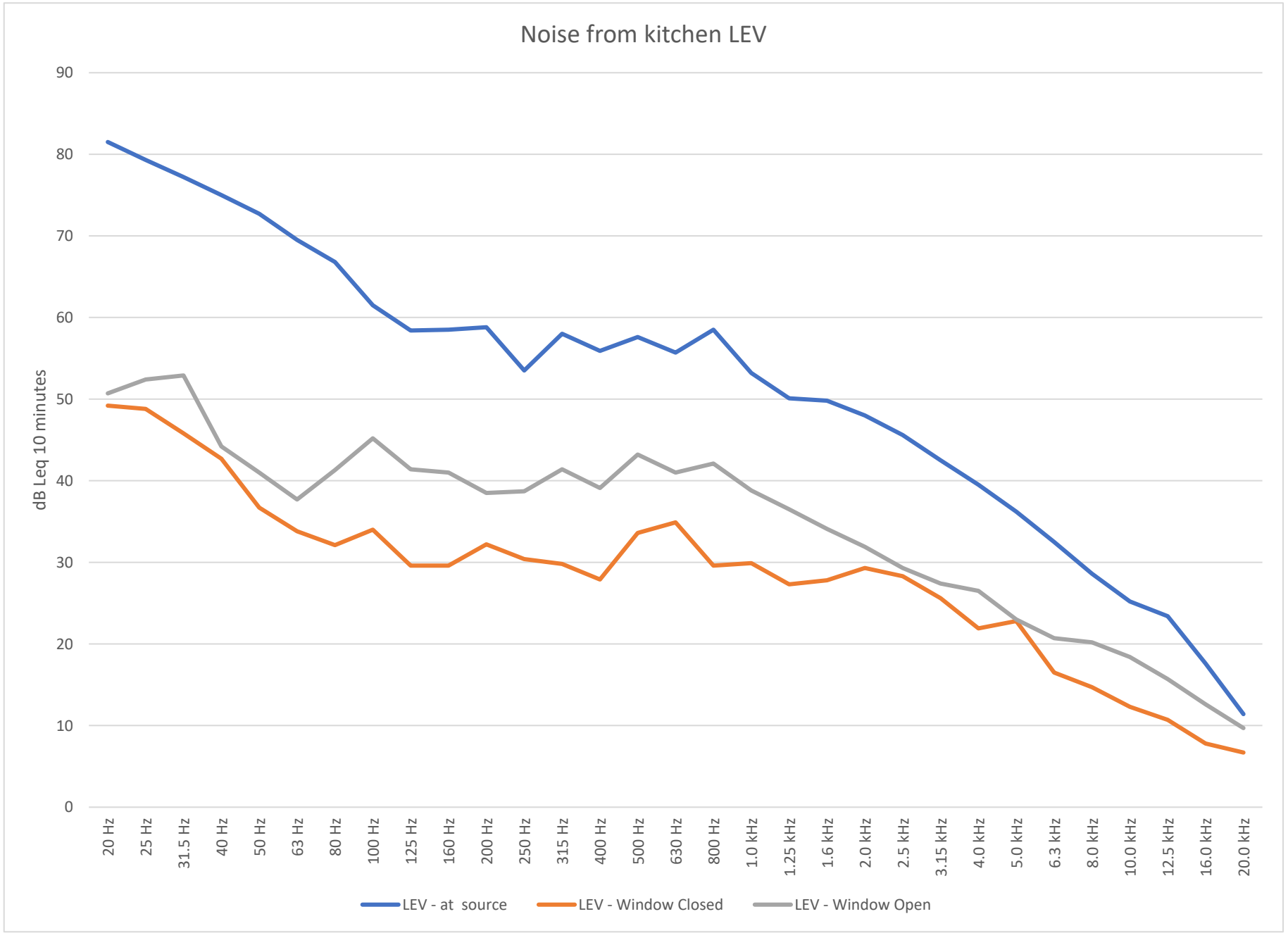
Charts

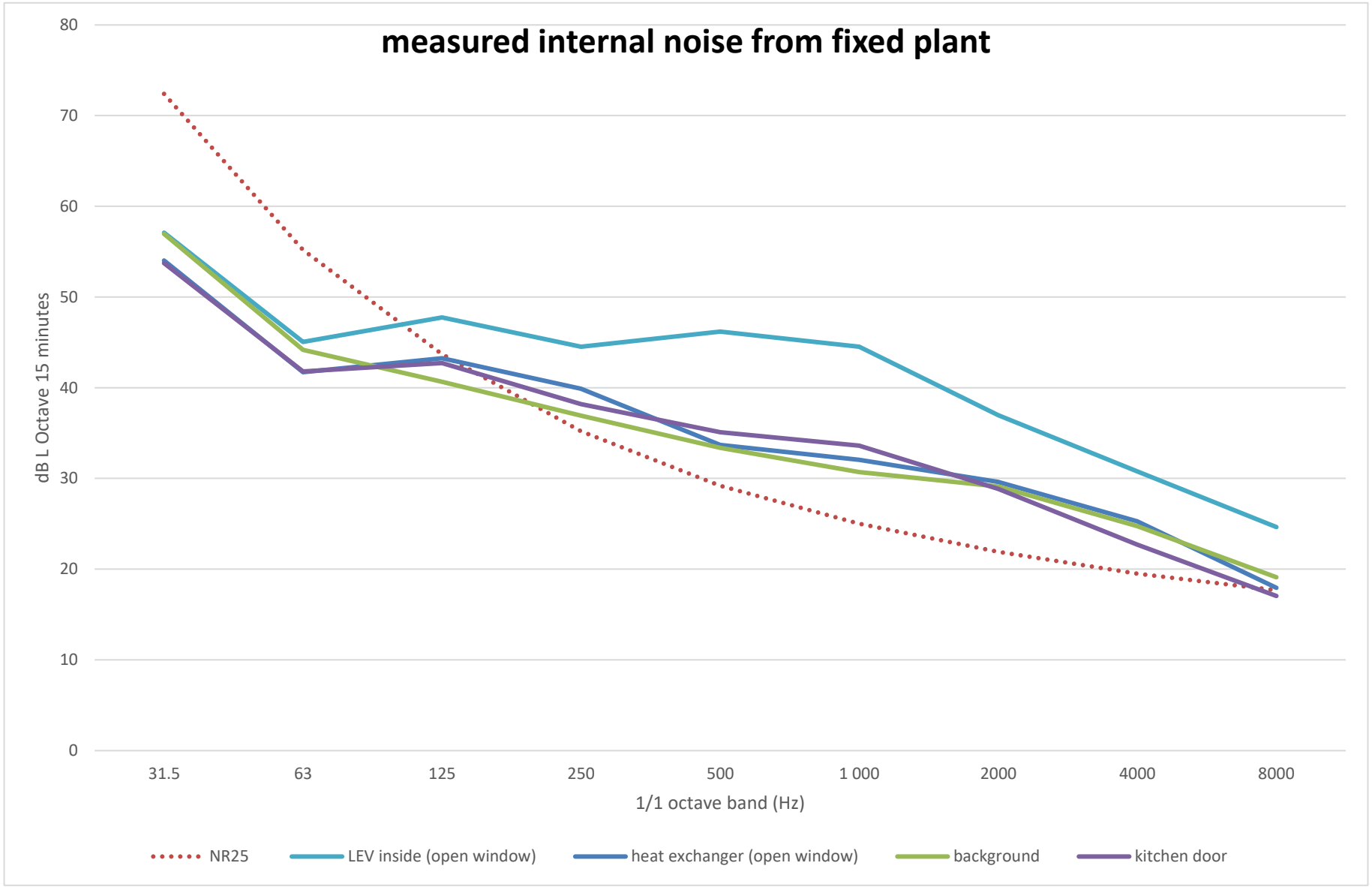

average noise levels in restaurant and apartment
dB Leq 10 minutes
90
80
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
Restaurant
Apartment
background

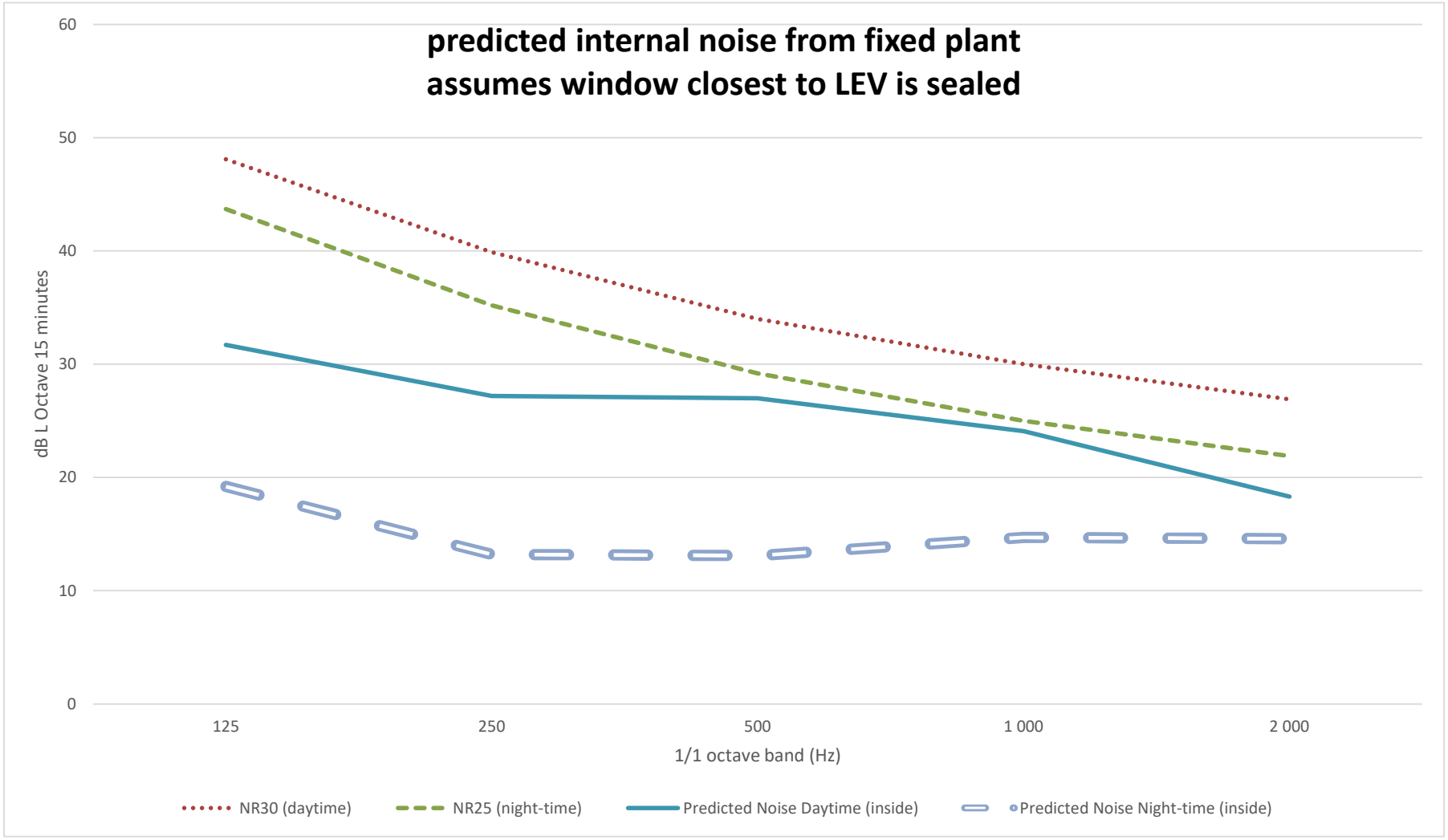

attenuation provided by floor (no adjustment for ambient background or RT)
difference - dB
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
Series1
Series2
Series3
Series4
Series5
Series6
Series7
Series8
Series9
Series10
Series11
Series12
average


attenuation provided by floor
(with RT adhustement and no adjustment for ambient background)
difference - dB
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
adjusted for RT


noise from heat exchanger
dB Leq 10 minutes
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
Heat Exchanger - Active Window Closed
Heat Exchanger - Active Window Open
Heat exchanger at source


Noise from kitchen LEV
dB Leq 10 minutes
90
80
70
60
50
40
30
20
10
0
20 Hz
25 Hz
31.5 Hz
40 Hz
50 Hz
63 Hz
80 Hz
100 Hz
125 Hz
160 Hz
200 Hz
250 Hz
315 Hz
400 Hz
500 Hz
630 Hz
800 Hz
1.0 kHz
1.25 kHz
1.6 kHz
2.0 kHz
2.5 kHz
3.15 kHz
4.0 kHz
5.0 kHz
6.3 kHz
8.0 kHz
10.0 kHz
12.5 kHz
16.0 kHz
20.0 kHz
LEV - at source
LEV - Window Closed
LEV - Window Open


measured internal noise from fixed plant
80
70
60
50
40
30
20
10
0
dB L Octave 15 minutes
31.5
63
125
250
500
1 000
2000
4000
8000
1/1 octave band (Hz)
NR25
LEV inside (open window)
heat exchanger (open window)
background
kitchen door


predicted internal noise from fixed plant
assumes window closest to LEV is sealed
60
50
40
30
20
10
0
dB L Octave 15 minutes
125
250
500
1 000
2 000
1/1 octave band (Hz)
NR30 (daytime)
NR25 (night-time)
Predicted Noise Daytime (inside)
Predicted Noise Night-time (inside)

Figures

Site Location

indicative site location

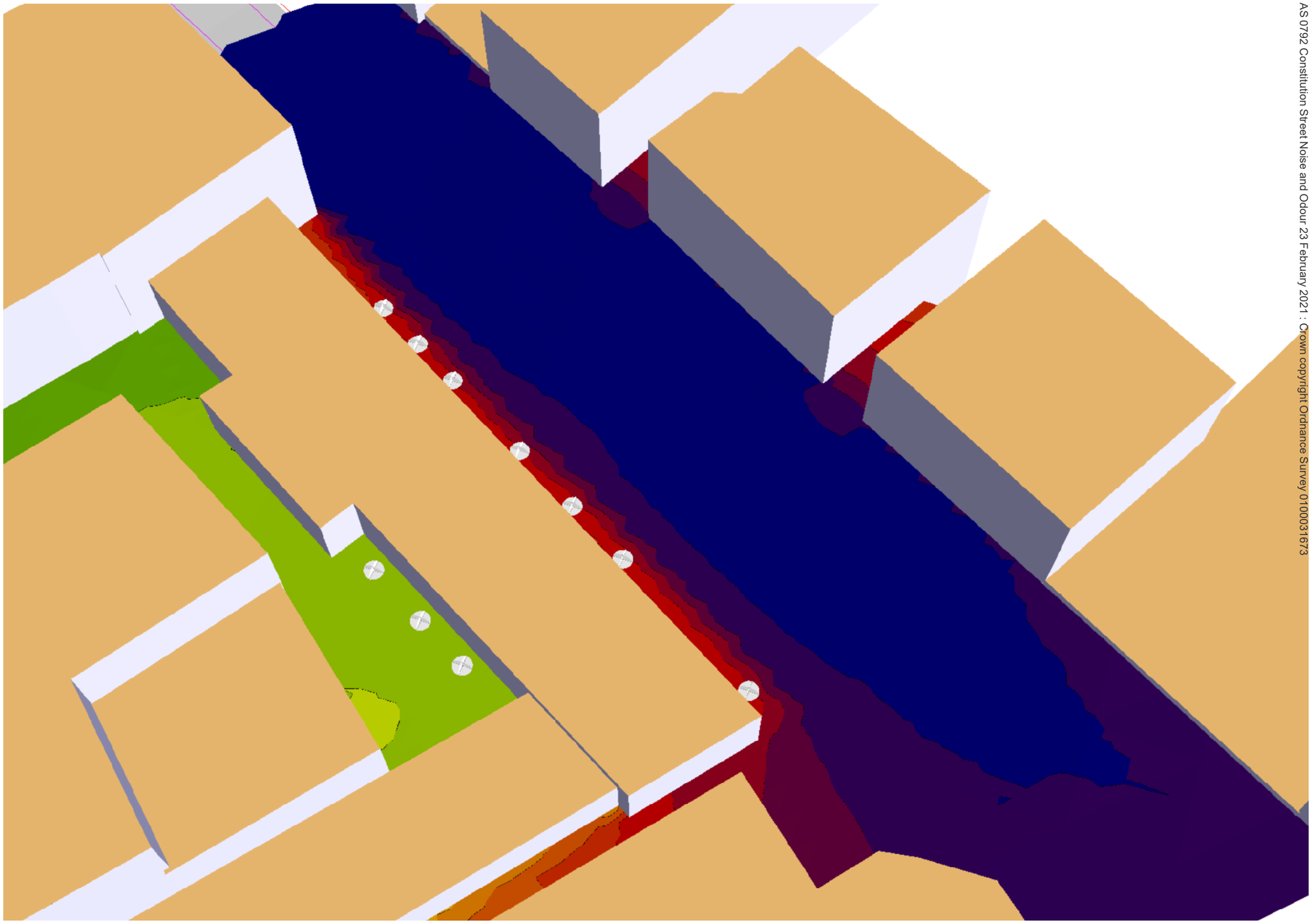
Figure 1

The Airshed

Model Layout

Figure 2

The Airshed

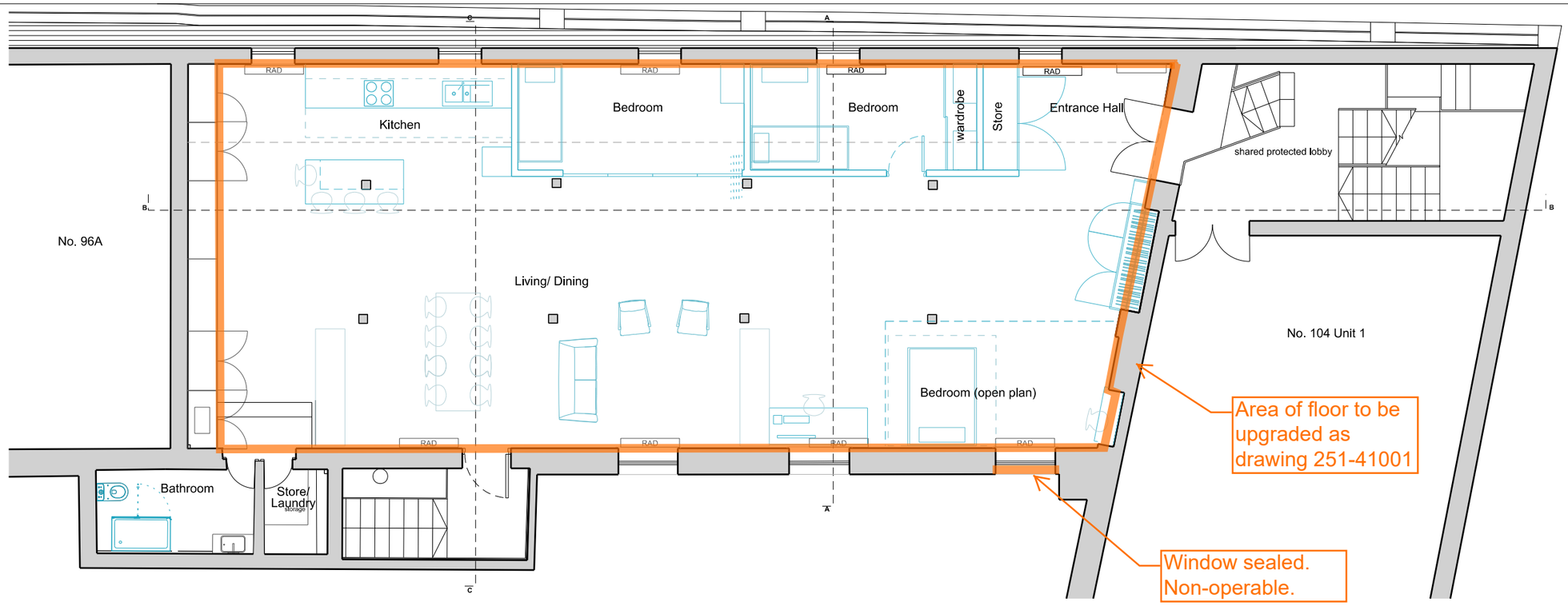


Scenario 2

Figure 3

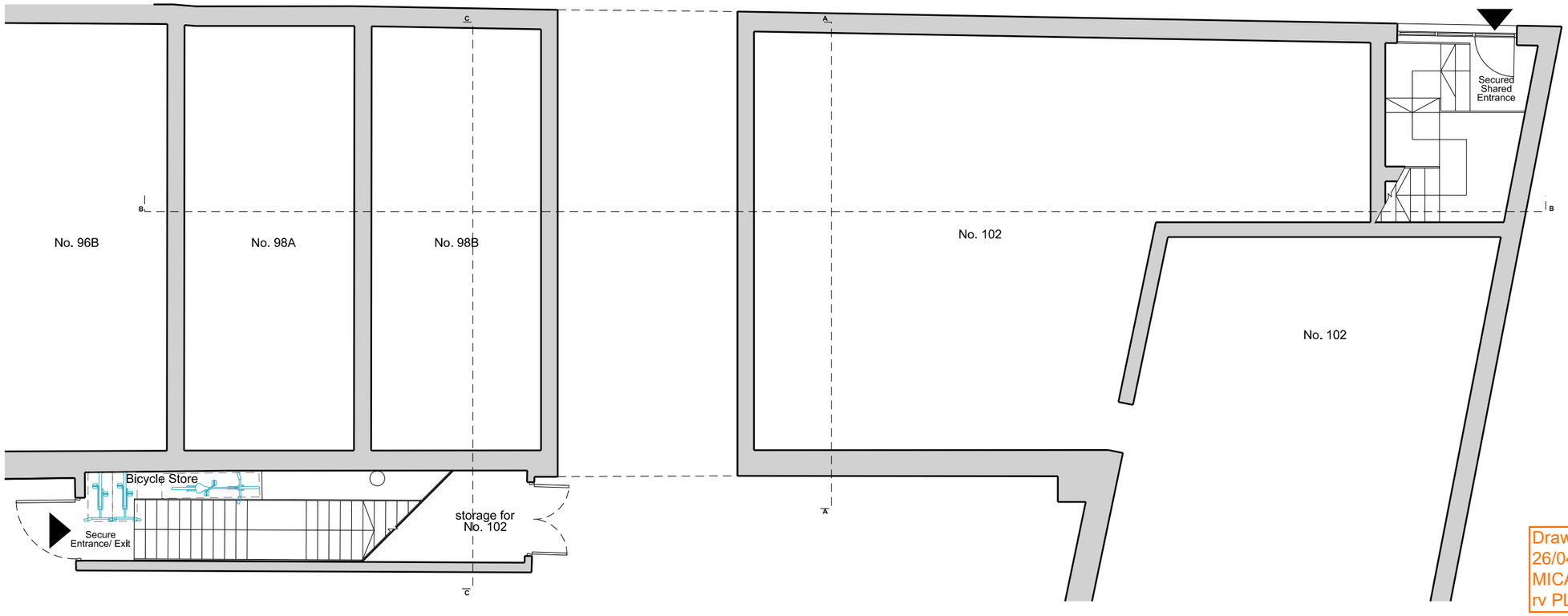
The Airshed

Appendix 1-1 – Project Description



First Floor Plan

02	251-19200



Ground Floor Plan

01	251-19200

Drawing Mark-up
26/04/2021
MICA Architects
rv PL2

NOTES
- ☐ Proposed
- ☐ Existing

REVISIONS

REV	DATE	DESCRIPTION
P1	04.12.20	FOR INFORMATION

0 1 2 3 4 5m

JOB: **HOGARTH LOFT**
104 CONSTITUTION STREET, UNIT 2

MICA
123 Camden High Street London NW1 7JR
T: 020 7284 1707 F: 020 7267 7836
info@micaarchitects.com www.micaarchitects.com

PLANNING

TITLE: **Ground & First Floor Plans**
PROPOSED

DRG #: **251-MICA-PL-00-DR-A-19200** REV: PL1

CHECKED	DRAWN	SCALE	SIZE	REV DATE
PM	KO	1:100	A3	04/12/20

DO NOT SCALE FROM THIS DRAWING. CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE.
ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

PLANNING

NOTES
- ☐ Proposed
- ☐ Existing

REVISIONS

REV	DATE	DESCRIPTION
P1	04.12.20	FOR INFORMATION

0 1 2 3 4 5m

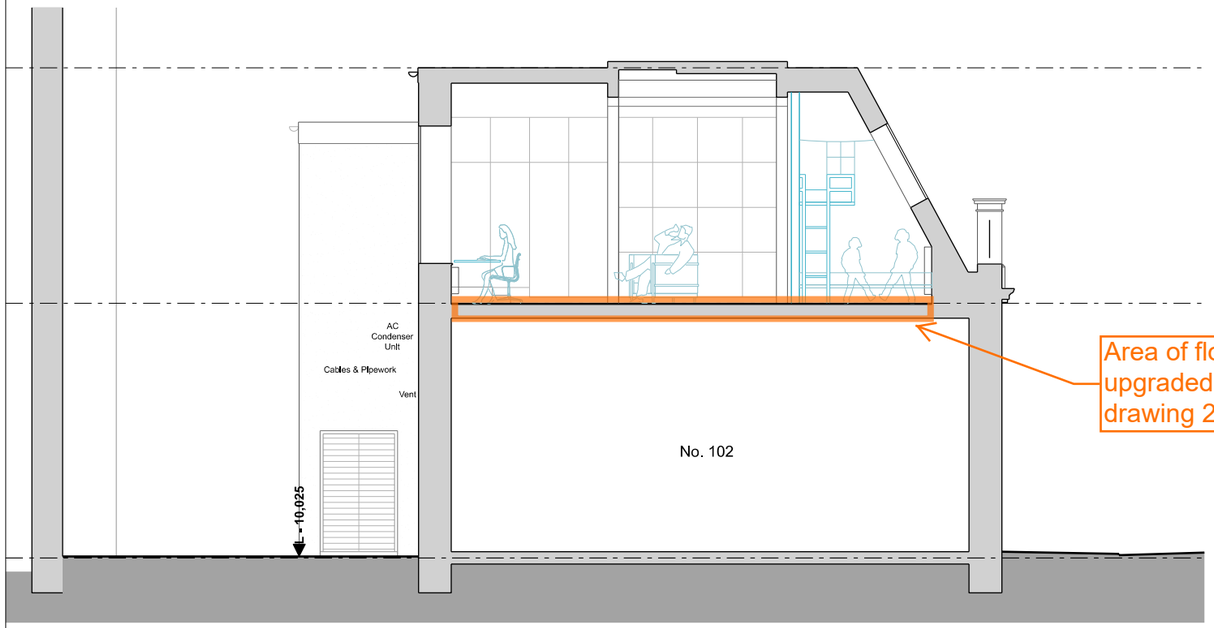
JOB
HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

MICA
123 Camden High Street London NW1 7JR
T: 020 7284 1777 F: 020 7267 7826
info@micaarchitects.com www.micaarchitects.com

TITLE
Roof Plan
PROPOSED

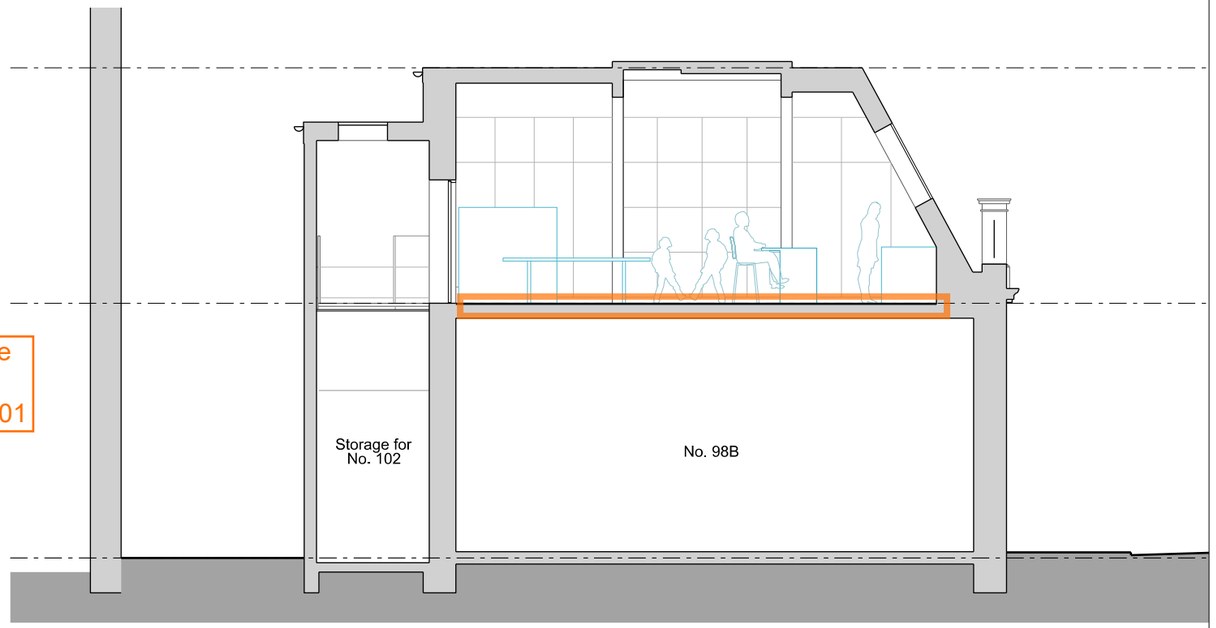
DRG # **251-MICA-PL-00-DR-A-19201** REV PL1

CHECKED	DRAWN	SCALE	SIZE	REV DATE
PM	KO	1:100	A3	04/12/20



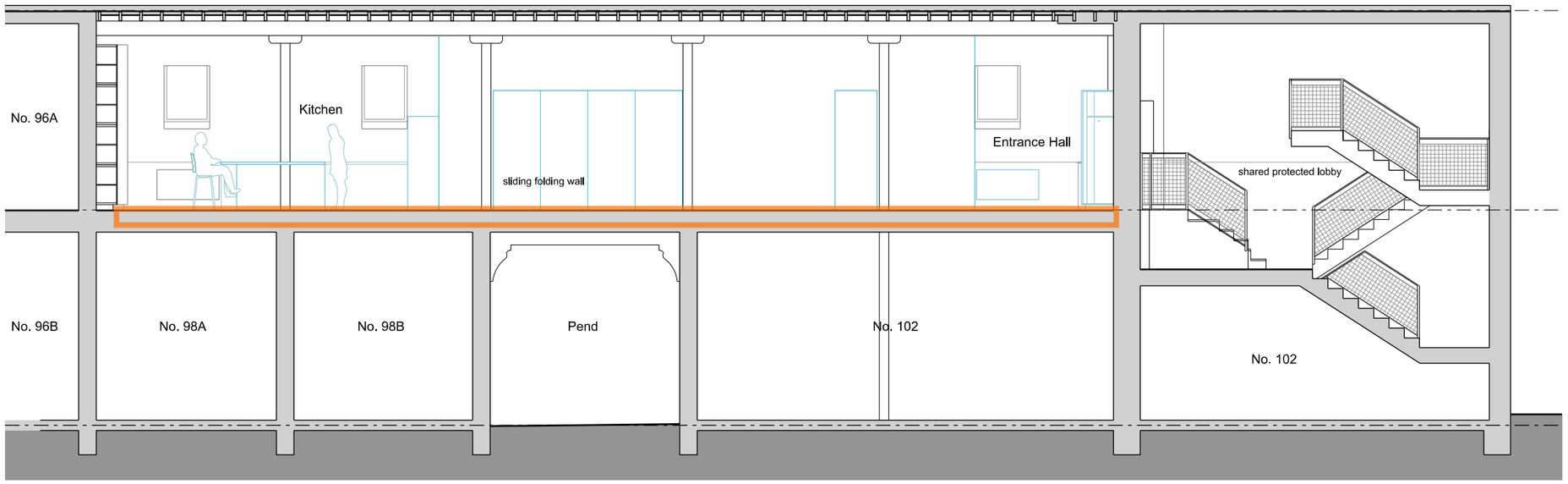
Section AA

01	251-19210



Section CC

03	251-19210



Section BB

02	251-19210

Drawing Mark-up
26/04/2021
MICA Architects
rv PL2

NOTES
☐ Proposed
☐ Existing

REVISIONS

REV	DATE	DESCRIPTION
PL1	04.12.20	PLANNING

0 1 2 3 4 5m

JOB
HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

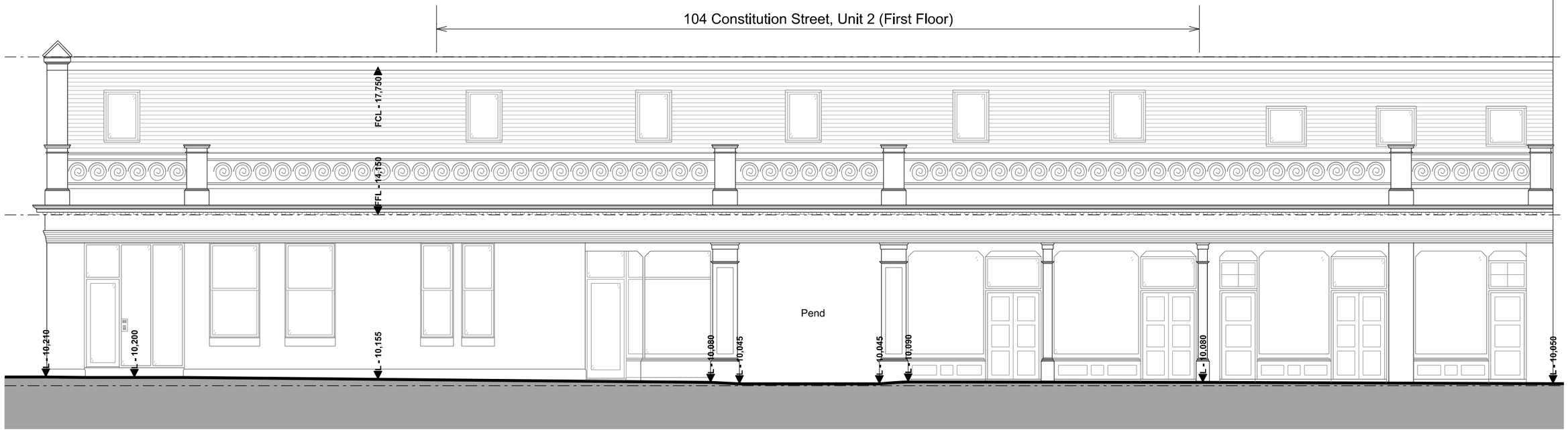
MICA
123 Camden High Street London NW1 7JR
T: 020 7284 1707 F: 020 7267 7836
info@micaarchitects.com www.micaarchitects.com

PLANNING

TITLE
Section A-A, B-B, & C-C
PROPOSED

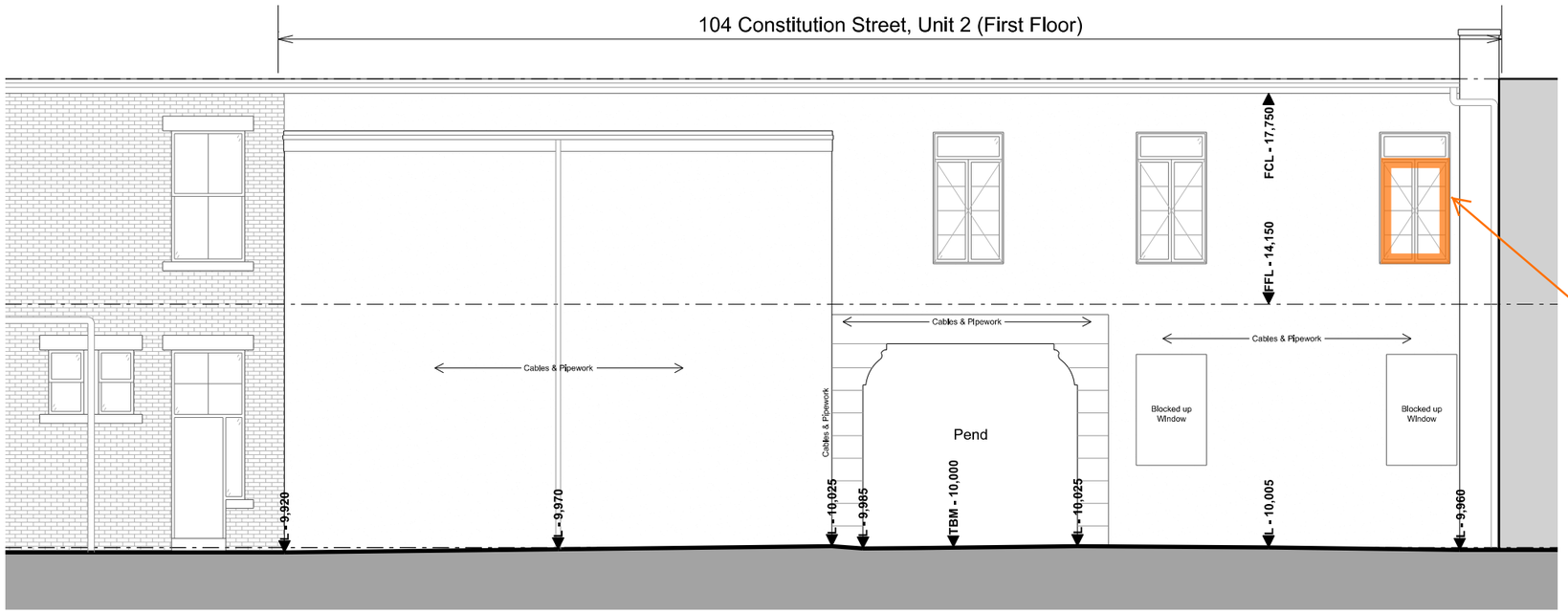
DRG # **251-MICA-PL-00-DR-A-19210** REV PL1

CHECKED	DRAWN	SCALE	SIZE	REV DATE
PM	KO	1:100	A3	04/12/20



East Elevation

01	251-19220



West Elevation

02	251-19220

Drawing Mark-up
26/04/2021
MICA Architects
rv PL2

DO NOT SCALE FROM THIS DRAWING. CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE.
ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

NOTES
☐ Proposed
☐ Existing

REVISIONS

REV	DATE	DESCRIPTION
PL1	04.12.20	PLANNING

0 1 2 3 4 5m

JOB
HOGARTH LOFT
104 CONSTITUTION STREET, UNIT 2

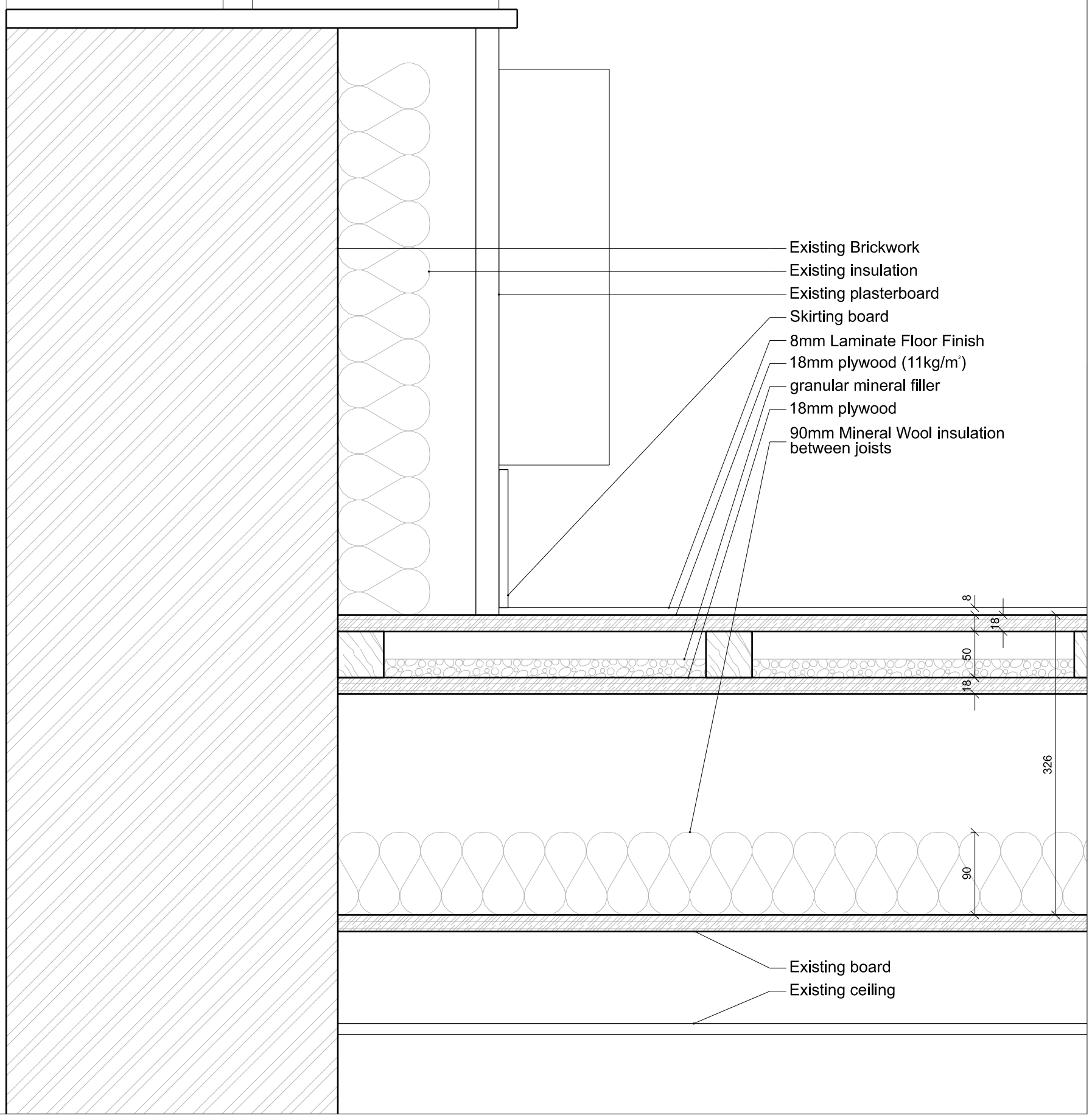
MICA
123 Camden High Street London NW1 7JR
T: 020 7284 1737 F: 020 7267 7926
info@micaarchitects.com www.micaarchitects.com

PLANNING

TITLE
East & West Elevations
PROPOSED

DRG # **251-MICA-PL-00-DR-A-19220** REV PL1

CHECKED	DRAWN	SCALE	SIZE	REV DATE
PM	KO	1:100	A3	04/12/20



DO NOT SCALE FROM THIS DRAWING. CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE.
ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

PRELIMINARY

NOTES

REVISIONS

REV	DATE	DESCRIPTION
PL1	26.04.21	PLANNING

JOB **HOGARTH LOFT**
104 CONSTITUTION STREET, EH6 6AW

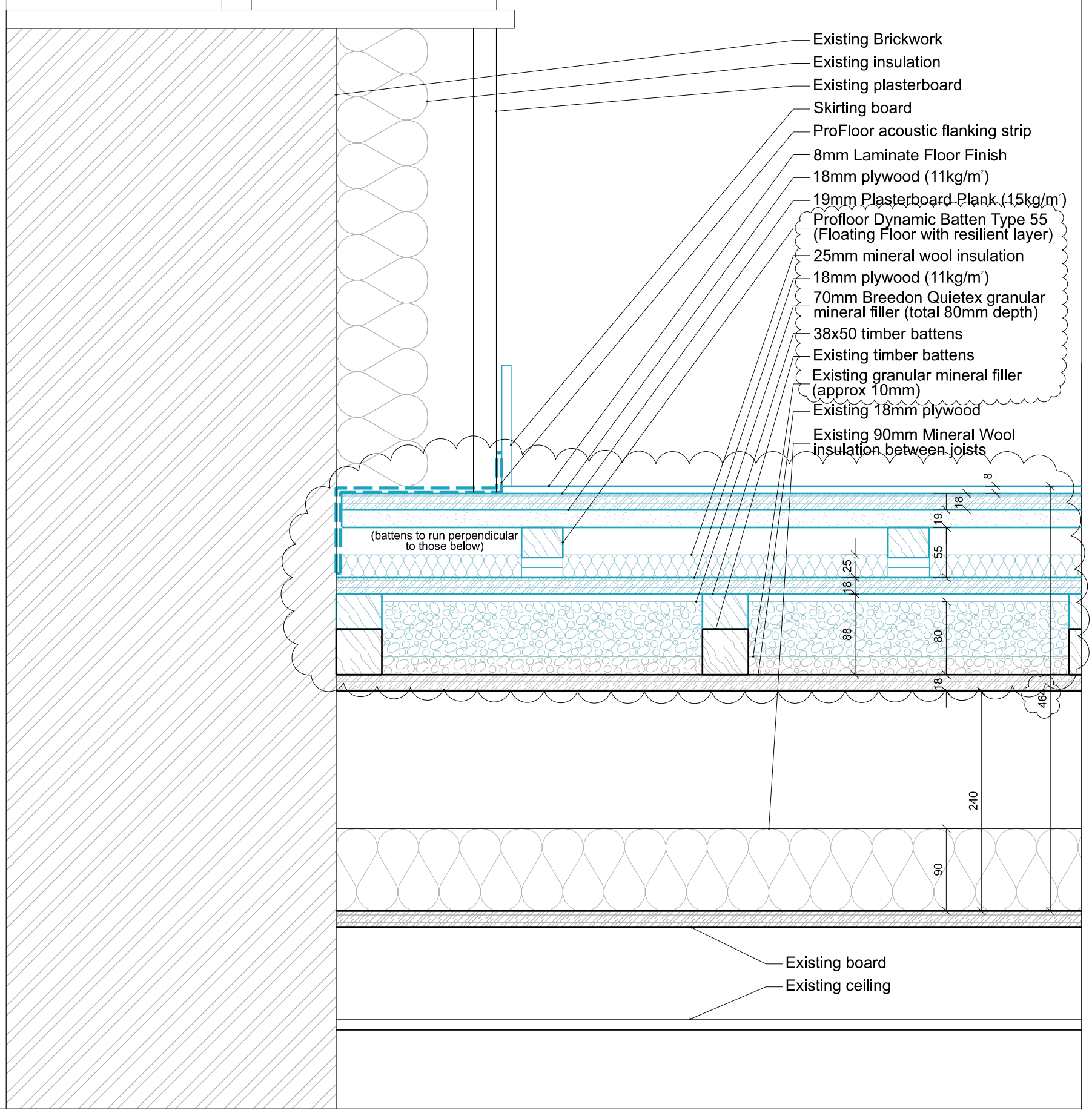
MICA
123 Camden High Street London NW1 7JR
T: 020 7284 1727 F: 020 7267 7826
Info@micaarchitects.com www.micaarchitects.com

TITLE **EXISTING EXTERNAL SECTION DETAIL**
Wall and Floor

DRG # **251-MICA-XX-01-DR-A-41000** REV PL1

CHECKED	DRAWN	SCALE	SIZE	REV DATE
PM	KO	1:5	A3	26/04/21

41001



DO NOT SCALE FROM THIS DRAWING. CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE.
ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.

PLANNING

NOTES
- ☐ Proposed
- ☐ Existing

REVISIONS

REV	DATE	DESCRIPTION
PL1	26.04.21	PLANNING
P1	22.07.21	DRAFT FOR COMMENT
PL2	27.07.21	REVISED PLANNING

JOB: **HOGARTH LOFT**
104 CONSTITUTION STREET, EH6 6AW

MICA
123 Camden High Street London NW1 7JR
T: 020 7284 1727 F: 020 7267 7826
Info@mlcaarchitects.com www.mlcaarchitects.com

TITLE: **PROPOSED EXTERNAL SECTION DETAIL**
Wall and Floor - Floating Floor

DRG #: **251-MICA-XX-01-DR-A-41001** REV: PL2

CHECKED	DRAWN	SCALE	SIZE	REV DATE
PM	KO	1:5	A3	27/07/21

Appendix 1-2 – Floor Sound Attenuation Calculations

Predicted noise through floor based on existing construction (above restaurant)									
Equation N	Description		*units*	**125**	**250**	**500**	**1k**	**2k**	**4k**
1	Typical restaurant noise level [1]		*dB*	83	77	73	72	68	64
2	Current floor performance[2]	50	*dB* D_w	34	42	53	57	57	55
3	Receiver noise level (existing floor)	(N_1 - N_2)	*dB*	49	35	20	15	11	9
4	NR15 (inaudiblity test)		*dB*	35	26	19	15	12	9
5	**Exceedance** / *Compliance*	(N_3 - N_4)	*dB*	**14**	**10**	***0***	***0***	*-1*	*0*

Notes

1. Based on measured spectra in ground floor restaurant under 'normal' conditions.
2. Based on data presented in Chart 1c

Predicted noise through floor based on previously proposed floor (above retail) [3]									
Equation N	Description		*units*	**125**	**250**	**500**	**1k**	**2k**	**4k**
1	Typical retail noise level [1]		*dB*	68	70	72	74	72	65
2	Current floor performance + Mass Law [2]	55	*dB* D_w	39	47	58	62	62	60
3	Receiver noise level (existing floor)	(N_1 - N_2)	*dB*	29	23	14	12	10	5
4	NR15 (inaudiblity test)		*dB*	35	26	19	15	12	9
5	**Exceedance** / *Compliance*	(N_3 - N_4)	*dB*	*-6*	*-3*	*-6*	*-3*	*-2*	*-4*

Notes

1. Robin MacKenzie Partnership November 2016. R-7401A-EK-MI. Table 4.4 Typical maximum takeaway noise levels (LA_{Fmax})
2. Where R_{AV} = 10 + 14.5 * $\log_{10}$(m) where m = density kg/m^2

Predicted noise through floor based on previously proposed floor (above restaurant) [3]									
Equation N	Description		*units*	**125**	**250**	**500**	**1k**	**2k**	**4k**
1	Typical restaurant noise level [1]		*dB*	83	77	73	72	68	64
2	Current floor performance + Mass Law [2]	55	*dB* D_w	39	47	58	62	62	60
3	Receiver noise level (existing floor)	(N_1 - N_2)	*dB*	44	30	15	10	6	4
4	NR15 (inaudiblity test)		*dB*	35	26	19	15	12	9
5	**Exceedance** / *Compliance*	(N_3 - N_4)	*dB*	**9**	**5**	***-5***	***-5***	*-6*	*-5*

Notes

1. Based on measured spectra in ground floor restaurant under 'normal' conditions.
2. Where R_{AV} = 10 + 14.5 * $\log_{10}$(m) where m = density kg/m^2

Predicted noise through floor with floating floor included in the design (above restaurant) [4]									
Equation N	Description		*units*	**125**	**250**	**500**	**1k**	**2k**	**4k**
1	Typical restaurant noise level [1]		*dB*	83	77	73	72	68	64
2	Current floor performance + Mass Law [2] + floating floor [3]	65	*dB* D_w	49	57	68	72	72	70
3	Receiver noise level (existing floor)	$(N_1 - N_2)$	*dB*	34	20	5	0	-4	-6
4	NR15 (inaudiblity test)		*dB*	35	26	19	15	12	9
5	**Exceedance** / *Compliance*	$(N_3 - N_4)$	*dB*	*-1*	*-5*	***-15***	***-15***	*-16*	*-15*

Notes

1. Based on measured spectra in ground floor restaurant under 'normal' conditions.
2. Where $R_{AV} = 10 + 14.5 * \log_{10}(m)$ where m = density kg/m^2

Appendix 1-3 – Floor Density Calculations

Floor Specification ***Existing***

No	Element	Density	Density	thickness	R_{AV}	Notes
		kg/m³	*kg/m²*	*m*	*dB*	
1	laminate floor	850	6.8	0.008		
2	plywood	600	10.8	0.018		
3	granular fill		35.0	0.025		assumes same density as per 60mm of quietex
4	plywood	600	10.8	0.018		
5	mineral wool	60	5.4	0.090		
6	existing board	664	12.0	0.018		assumes same density as plasterboard
7	existing ceiling	664	8.0	0.012		assumes 12mm plasterboard
Sum			89	0.189		
Mass Law mean attenuation					38	

Floor Specification ***Install mineral wool in void***

No	Element	Density	Density	thickness	R_{AV}	Notes
		kg/m³	*kg/m²*	*m*	*dB*	
1	laminate floor	850	6.8	0.008		
2	plywood	600	10.8	0.018		
3	plasterboad plank	664	12.6	0.019		
4	mineral wool	60	12.6	0.090		
5	plywood	600	10.8	0.018		
6	mineral wool	60	10.8	0.090		
7	existing board	664	12.0	0.018		assumes same density as plasterboard
8	existing ceiling	664	8.0	0.012		assumes 12mm plasterboard
Sum			84	0.273		

Mass Law mean attenuation	38

Floor Specification ***Upgraded with Quietex and rockfloor***

No	Element	Density	Density	thickness	R_{AV}	Notes
		kg/m³	*kg/m²*	*m*	*dB*	
1	laminate floor	850	6.8	0.008		
2	plywood	600	10.8	0.018		
3	plasterboad plank	664	12.6	0.019		
4	rockfloor resilient	120	3.0	0.025		
5	plywood	600	10.8	0.018		
6	mineral wool	60	12.6	0.120		
7	granular fill	1400	112.0	0.080		assumes density of 84 kg/m² based on 60mm
8	plywood	600	9.0	0.015		
9	existing board	664	12.0	0.018		assumes same density as plasterboard
10	existing ceiling	664	8.0	0.012		assumes 12mm plasterboard
Sum			198	0.333		
Mass Law mean attenuation					43	

Floor Specification ***Upgraded with Quietex and improved surface treatment***

No	Element	Density	Density	thickness	R_{AV}	Notes
		kg/m³	*kg/m²*	*m*	*dB*	
1	laminate floor	850	6.8	0.008		
2	plywood	600	10.8	0.018		
3	plasterboad plank	664	12.6	0.019		
4	mineral wool	60	12.6	0.090		
5	plywood	600	10.8	0.018		
6	granular fill	1400	112.0	0.080		
7	existing board	664	12.0	0.018		assumes same density as plasterboard
8	existing ceiling	664	8.0	0.012		assumes 12mm plasterboard
Sum			*186.0*	*0.263*		

Mass Law mean attenuation	43

Appendix 2.1 – Baseline Survey at Apartment

Noise Survey

Project Number: AS 0792 **Project Name:** Constitution Street, Restaurant
Log Book Number: 113

Start Date / Time: Thursday 18th Febraury 2021, 17:00

Site:	Temperature (Celsius)	Cloud Cover (Oktas)	Wind Speed (m/s)	Wind Direction	Sound Level Meter
Roof Measurements	8	4	1	SE	6
Outdoor Rear	7	Dark Overcast	0	-	6
Indoor Measurments (1st Floor)	-	-	-	-	5
Indoor Measurments (Ground Floor)	-	-	-	-	6

Norsonic Nor-140 Sound Level Meter 5	Serial No.	1406913
Norsonic Nor-1251 Acoustic Calibrator B	Serial No.	34961
Norsonic Nor-1225 Microphone	Serial No.	208201
Norsonic Nor-1217 Outdoor Protection Kit	Serial No.	12175402
Calibration Factor 113.8	Calibration End:	113.8

Norsonic Nor-140 Sound Level Meter 6	Serial No.	1406914
Norsonic Nor-1251 Acoustic Calibrator B	Serial No.	34961
Norsonic Nor-1225 Microphone	Serial No.	212990
Norsonic Nor-1217 Outdoor Protection Kit	Serial No.	12175403
Calibration Factor 113.8	Calibration End:	113.8


Measurement at Extraction Vent - LEV


Heat Exchanger


Measurement at Active Window - LEV


Measurement at Kitchen Door

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, CM6 1HD, England
www.campbell-associates.co.uk
info@campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

CALIBRATION

0789

Certificate number: U34600

Certificate of Calibration and Conformance

Test object:	**Sound Calibrator**
Manufacturer:	**Norsonic**
Type:	**1251**
Serial no:	**34961**
Customer:	The Airshed Ltd
Address:	5 Lauder Place, East Linton. EH40 3DB.
Contact Person:	Hilary Fraser.

Measurement Results:	Level	Level Stability	Frequency	Frequency Stability	Distortion
1:	114.17 dB	0.05 dB	1000.66 Hz	0.00 %	0.35 %
2:	114.18 dB	0.05 dB	1000.67 Hz	0.00 %	0.35 %
3:	114.18 dB	0.05 dB	1000.67 Hz	0.00 %	0.34 %
Result (Average):	**114.18 dB**	**0.05 dB**	**1000.66 Hz**	**0.00 %**	**0.35 %**
Expanded Uncertainty:	0.10 dB	0.02 dB	1.00 Hz	0.01 %	0.10 %
Degree of Freedom:	>100	>100	>100	>100	>100
Coverage Factor:	2.00	2.00	2.00	2.00	2.00

The stated level is relative to 20µPa. The level is traceable to National Standards.
The stated level is valid at reference conditions. The following correction factors have been applied during the measurement: Pressure: 0.0005 dB/kPa Temperature: 0.003 dB/°C Relative humidity: 0.000 dB/%RH Load volume : 0.0003 dB/mm3
The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.
Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\2020\NOR1251_34961_M1.nmf

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	101.219 ± 0.042 kPa	22.9 ± 0.1 °C	34.1 ± 1.6 %RH

Date received for calibration:	16/04/2020
Date of calibration:	17/04/2020
Date of issue:	17/04/2020
Engineer	[redacted]
	Michael Tickner
Supervisor	[redacted]
	Darren Batten TechIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceablity of measurement to recognised national standards, and to the units of measurement realised at an accredited national physical laboratory or other recognised standards laboratories. This certificate may not be reproduced other than in full without the prior written approval of the issuing laboratory.

Template UKAS_PE v2.10 DocR Cert-C0001

Certificate number: U34600

Preconditioning
The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Measurements
The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Method
Calibration has been performed as set out in the current version of CA Technical procedure TP01

Instruments and program
A complete list of equipment, hardware and software that has been used in this calibration is available from the calibration laboratory on request.

Traceability
The measured values are traceable to an accredited national physical laboratory within the EU or EFTA.

Comment
Calibrated as received, no adjustments made.

Statement of conformance
As public evidence was available[1], from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of that BS EN IEC 60942:2003.

[1] This evidence is held on file at the calibration laboratory.

Notes:
The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in **BOLD** are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Sonitus House, 5b Chelmsford Road Industrial Estate, Great Dunmow, GB-CM6 1HD
Tel (+44) 01371 871030 Fax (+44) 01371 879106
email calibration@campbell-associates.co.uk

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
www.campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

CALIBRATION

0789

Certificate of Calibration and Conformance

Certificate number: U31946

Test object:	**Sound Level Meter, BS EN IEC 61672-1:2003 Class 1 (Precision)**
Producer :	**Norsonic**
Type :	**140**
Serial No.:	**1406913**
Customer:	**The Airshed Ltd**
Address:	**5 Lauder Place,**
	East Linton. EH40 3DB.
Contact Person:	**Hilary Fraser.**

Method :
Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. These are based on the procedures for periodic verification of sound level meters as set out in BS EN IEC 61672-3:2006. Results and conformance statement are overleaf and detailed results are in the attached Test Report.

Tested

	Producer:	Type:	Serial No:	Certificate number
Microphone	Norsonic	1225	208201	31945
Calibrator*	Norsonic	1251	30873	U30563
Preamplifier	Norsonic	1209	21061	Included

Additional items that also have been submitted for verification
Wind shield -
Attenuator -
Extension cable -
These items have been taken into account wherever appropriate.

Instruction manual: Im140_1Ed6R3En Firmware version: 4.0.1282 The test object is a single channel instrument.

Conditions	Pressure	Temperature	Humidity
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	101.34 ±0.05 kPa	22.0 ±0.2 °C	47.0 ±0.7 %RH

Date received for calibration: 22/05/2019
Date of calibration: 30/05/2019
Date of issue: 30/05/2019
Engineer

[redacted]
Michael Tickner

Supervisor [redacted]
Darren Batten TechIOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.
* The calibrator was complete with any required coupler for the microphone specified.

Certificate of Calibration and Conformance

UKAS Laboratory Number 0789

Certificate number: U31946

Conformance

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to BS EN IEC 61672-1:2002 and similarly that the associated sound calibrator conforms to BS EN IEC 60942.

Statement of conformance

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of BS EN IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available[1], from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with BS EN IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in BS EN IEC 61672-1:2002, and that the sound level meter submitted for testing conforms to the class 1 requirements of BS EN IEC 61672-1:2003.

[1] This evidence is held on file at the calibration laboratory

Summary of Measurement Results

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9	Passed
Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14	Passed
Toneburst response - IEC 61672-3 Ed.1 Clause 16	Passed
Peak C sound level - IEC 61672-3 Ed.1 Clause 17	Passed
Overload indication - IEC 61672-3 Ed.1 Clause 18	Passed

Comment

Correct level with associated calibrator is 113.9dB(A).

Observations

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9

Reference level: 114.0 dB
Reference Range: 130 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator: WSC5 - Nor1251-31824
Reference calibrator level: 113.99
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.84
Calibrator level before adjustment: 113.8
After calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.84
Reference calibrator level after calibration: 113.8
Associated Calibrator: Norsonic - 1251 - 30873
Associated calibrator level: 114.07
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.92
Indicated level: 113.9
Final level statement:
Environmental corrections after calibration: 0.00
Other corrections: -0.15
Notional level: 113.92
Calibrator level after adjustment: 113.9
This value shall be used for adjusting the sound level meter in the future.
Test Passed

Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2

Network	Level (dB)	Comment
A	15.4	Microphone installed
A	9.9	Equivalent capacity
C	11.9	Equivalent capacity
Z	19.5	Equivalent capacity

Test Passed

Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11

C-Weighted results

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
125 Hz	0.2	0.2	0.0	0.1	0.0	0.1			0.2	+-1.5	0.2	P
1 kHz	0.0	0.2	0.1	0.1	-0.1	0.1			0.3	+-1.1	0.0	P
4 kHz	-1.2	0.2	1.1	0.2	0.0	0.2			0.3	+-1.6	-0.1	P
8 kHz	-3.3	0.2	3.4	0.2	0.0	0.2			0.4	+2.1/-3.1	0.1	P

The level obtained at 1 kHz was used as reference for the calculations.
This level was: 91.80 dB.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
Frequency response test using electrostatic actuator.
Sources for correction data:
Microphone field corrections and uncertainty: Norsonic AS
Case reflections and uncertainty: Norsonic Cert. CAL022-2011-2849
Wind screen corrections and uncertainty:
Test Passed

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

A-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	P
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	P
250 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.4	0.0	P
500 Hz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.4	0.1	P
1 kHz	0.0	0.1	0.0	0.1	-0.1	0.1			0.19	+-1.1	-0.1	P
2 kHz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.6	0.1	P
4 kHz	-0.1	0.1	-0.1	0.2	0.0	0.2			0.31	+-1.6	-0.2	P
8 kHz	0.0	0.1	0.1	0.2	0.0	0.2			0.31	2.1/3.1	0.1	P
16 kHz	0.0	0.1	0.8	0.3	-0.1	0.3			0.44	3.5/17	0.7	P

C-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	P
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	P
250 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.4	0.0	P
500 Hz	0.1	0.1	0.0	0.1	0.1	0.1			0.19	+-1.4	0.2	P
1 kHz	0.0	0.1	0.0	0.1	-0.1	0.1			0.19	+-1.1	-0.1	P
2 kHz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.6	0.1	P
4 kHz	-0.1	0.1	-0.1	0.2	0.0	0.2			0.31	+-1.6	-0.2	P
8 kHz	0.0	0.1	0.1	0.2	0.0	0.2			0.31	2.1/3.1	0.1	P
16 kHz	0.0	0.1	0.8	0.3	-0.1	0.3			0.44	3.5/17	0.7	P

Z-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

63 Hz	0.0	0.1	0.0	0.1	0.0	0.1	0.19	+-1.5	0.0	P
125 Hz	-0.1	0.1	0.0	0.1	0.0	0.1	0.19	+-1.5	-0.1	P
250 Hz	-0.1	0.1	0.0	0.1	0.0	0.1	0.19	+-1.4	-0.1	P
500 Hz	-0.1	0.1	0.0	0.1	0.1	0.1	0.19	+-1.4	0.0	P
1 kHz	-0.1	0.1	0.0	0.1	-0.1	0.1	0.19	+-1.1	-0.2	P
2 kHz	-0.1	0.1	0.0	0.1	0.1	0.1	0.19	+-1.6	0.0	P
4 kHz	-0.1	0.1	-0.1	0.2	0.0	0.2	0.31	+-1.6	-0.2	P
8 kHz	-0.1	0.1	0.1	0.2	0.0	0.2	0.31	2.1/3.1	0.0	P
16 kHz	-0.1	0.1	0.8	0.3	-0.1	0.3	0.44	3.5/17	0.6	P

The actual frequency response of Norsonic / 1225 208201 has been used for the calculations.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
The calculated uncertainties are checked against the requirements in the standard.
Sources for correction data:
Microphone response and uncertainty: Measured response / Settings fil
Case reflections and uncertainty: Norsonic Cert. CAL022-2011-2849
Test Passed

Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.1	0.12	0.1
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	91.9	0.12	-0.1
251.2	92.0	91.9	0.12	-0.1
501.2	92.0	91.9	0.12	-0.1
1000.0	92.0	91.9	0.12	-0.1
1995.3	92.0	91.9	0.12	-0.1
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	91.9	0.12	-0.1
15848.9	92.0	91.9	0.12	-0.1

Test Passed

Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13

Weightings Time	Netw	Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Fast	A	114.0	114.0	0.4	-0.4	0.12	0.0	P
Fast	C	114.0	114.0	0.4	-0.4	0.12	0.0	P
Fast	Z	114.0	114.0	0.4	-0.4	0.12	0.0	P
Slow	A	114.0	113.9	0.3	-0.3	0.12	-0.1	P
Leq	A	114.0	114.0	0.3	-0.3	0.12	0.0	P
SEL	A	124.0	124.0	0.3	-0.3	0.12	0.0	P

Test Passed

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Measured at 8 kHz						
114.0	114.0	1.1	-1.1	0.12	0.0	P
119.0	119.0	1.1	-1.1	0.12	0.0	P
124.0	124.0	1.1	-1.1	0.12	0.0	P
129.0	129.0	1.1	-1.1	0.12	0.0	P
131.0	131.0	1.1	-1.1	0.12	0.0	P
132.0	132.0	1.1	-1.1	0.12	0.0	P
133.0	133.0	1.1	-1.1	0.12	0.0	P
134.0	134.0	1.1	-1.1	0.12	0.0	P
135.0	135.0	1.1	-1.1	0.12	0.0	P
136.0	136.0	1.1	-1.1	0.12	0.0	P
114.0	114.0	1.1	-1.1	0.12	0.0	P
109.0	109.0	1.1	-1.1	0.12	0.0	P
104.0	104.0	1.1	-1.1	0.12	0.0	P
99.0	99.0	1.1	-1.1	0.12	0.0	P
94.0	94.0	1.1	-1.1	0.12	0.0	P
89.0	89.0	1.1	-1.1	0.12	0.0	P
84.0	84.0	1.1	-1.1	0.12	0.0	P
79.0	79.0	1.1	-1.1	0.12	0.0	P
74.0	74.0	1.1	-1.1	0.12	0.0	P
69.0	69.0	1.1	-1.1	0.12	0.0	P
64.0	64.0	1.1	-1.1	0.12	0.0	P

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
59.0	59.0	1.1	-1.1	0.12	0.0	P
54.0	54.0	1.1	-1.1	0.12	0.0	P
49.0	49.0	1.1	-1.1	0.12	0.0	P
44.0	44.0	1.1	-1.1	0.12	0.0	P
39.0	39.0	1.1	-1.1	0.12	0.0	P
34.0	34.0	1.1	-1.1	0.12	0.0	P
30.0	30.0	1.1	-1.1	0.12	0.0	P
29.0	29.1	1.1	-1.1	0.12	0.1	P
28.0	28.1	1.1	-1.1	0.12	0.1	P
27.0	27.1	1.1	-1.1	0.12	0.1	P
26.0	26.2	1.1	-1.1	0.12	0.2	P
25.0	25.2	1.1	-1.1	0.12	0.2	P
24.0	24.2	1.1	-1.1	0.12	0.2	P

Test Passed

Toneburst response - IEC 61672-3 Ed.1 Clause 16

Burst type	Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
Fast 200 mSec	134.0	133.9	0.8	-0.8	0.16	-0.1	P
Fast 2.0 mSec	117.0	116.7	1.3	-1.8	0.16	-0.3	P
Fast 0.25 mSec	108.0	107.5	1.3	-3.3	0.16	-0.5	P
Slow 200 mSec	127.6	127.5	0.8	-0.8	0.16	-0.1	P
Slow 2.0 mSec	108.0	107.8	1.3	-3.3	0.16	-0.2	P
SEL 200 mSec	128.0	127.9	0.8	-0.8	0.16	-0.1	P
SEL 2.0 mSec	108.0	107.9	1.3	-1.8	0.16	-0.1	P
SEL 0.25 mSec	99.0	98.4	1.3	-3.3	0.16	-0.6	P

Test Passed

Peak C sound level - IEC 61672-3 Ed.1 Clause 17

Pulse Type	Pulse Freq. (Hz)	Ref. RMS (dB)	Ref. Peak (dB)	Measured Value (dB)	Lim. (+/-dB)	Uncert. (dB)	Dev. (dB)	Result
1 cycle	8k	126.0	129.4	128.7	2.4	0.2	-0.7	P
Pos 1/2 cycle	500	129.0	131.4	131.3	1.4	0.2	-0.1	P
Neg 1/2 cycle	500	129.0	131.4	131.3	1.4	0.2	-0.1	P

Test Passed

Overload indication - IEC 61672-3 Ed.1 Clause 18

	Measured (dB)	Lim. (+/-dB)	Uncert. (dB)	Result
Level difference of positive and negative pulses:	0.0	1.8	0.16	P
Positive 1/2 cycle 4 kHz. Overload occurred at:	138.7			
Negative 1/2 cycle 4 kHz. Overload occurred at:	138.7			

Test Passed

*** End of results ***

Calibration Report

Certificate No.:31945

Manufacturer: Norsonic
Type: 1225
Serial no: 208201

Customer: The Airshed Ltd
Address: 5 Lauder Place,
East Linton. EH40 3DB.
Contact Person: Hilary Fraser.

Measurement Results:

	Sensitivity: (dB re 1V/Pa)	Capacitance: (pF)
1:	-25.65	22.6
2:	-25.65	22.6
3:	-25.65	22.5
Result (Average):	**-25.65**	**22.5**
Expanded Uncertainty:	0.10	1.00
Degree of Freedom:	>100	>100
Coverage Factor:	2.00	2.00

The following correction factors have been applied during the measurement:
Pressure:-0.001 dB/kPa Temperature:-0.005 dB/°C Relative humidity:0.000 dB/%RH

Reference Calibrator: WSC1 - Nor1253-24269 Volume correction: 0.000 dB
Records:K:\C A\Calibration\Nor-1504\Nor-1017 MicCal\2019\NOR1225_208201_M1.nmf
Measurement procedure: TP05
All results quoted are directly traceable to National Physical Laboratory, London

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA publication EA-4/02.

Comment:

Environmental conditions:

Pressure:	Temperature:	Relative humidity:
101.338 ± 0.041 kPa	21.8 ± 0.1 °C	45.6 ± 1.3 %RH

Date of calibration: 30/05/2019
Date of issue: 30/05/2019

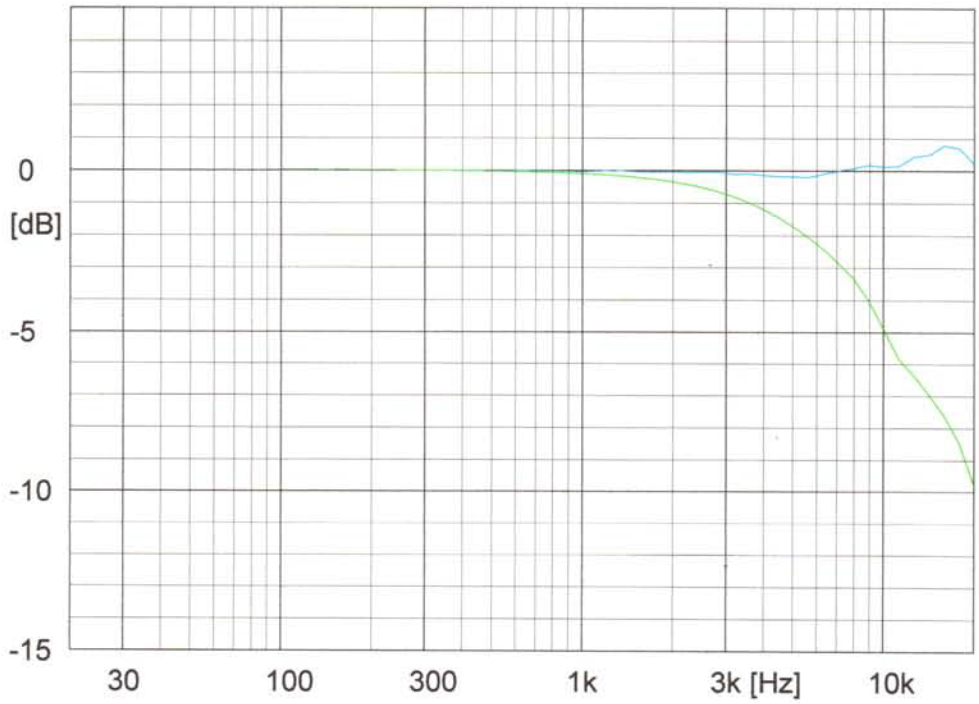
Supervisor : Darren Batten TechIOA
Engineer :

[redacted]

Michael Tickner
Software version: 6.0h

Campbell Associates
www.campbell-associates.co.uk

Microphone Calibration Certificate



Norsonic
Type: 1225

Serial no: 208201

Sensitivity: 52.17 mV/Pa
-25.65 ±0.10 dB re. 1 V/Pa
Capacitance: 22.5 ±1.0 pF
Date: 30/05/2019

Signature: [redacted]

Measurement conditions:

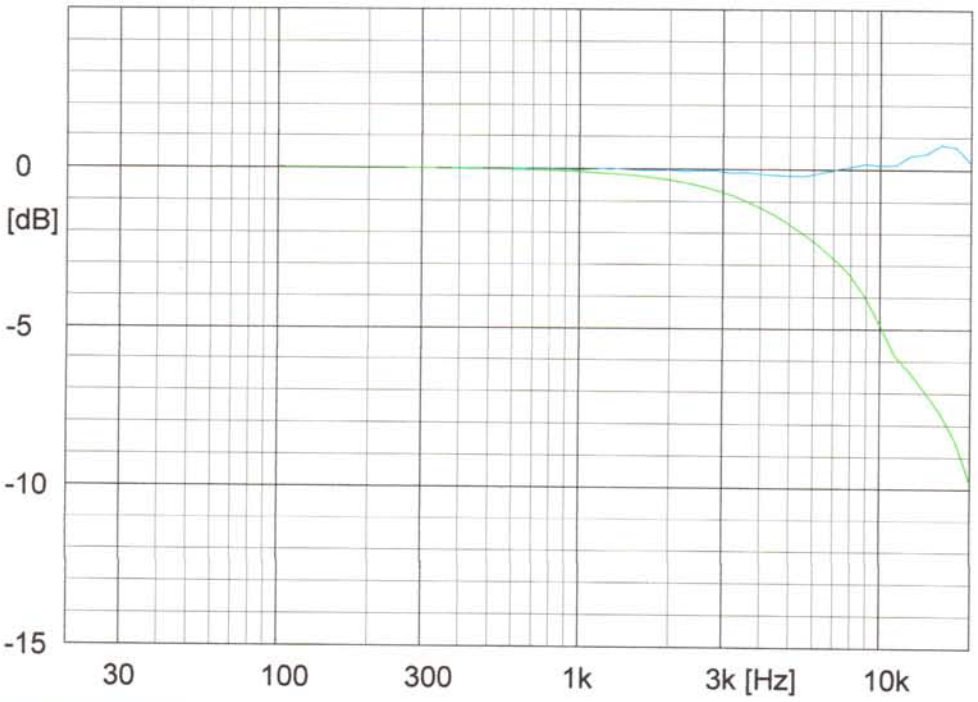
Polarisation voltage:	200.0 V
Pressure:	101.34 ±0.04 kPa
Temperature:	21.8 ±0.1 °C
Relative humidity:	45.6 ±1.3 %RH

Results are normalized to the reference conditions.

Free field response
Pressure (Actuator) response

Campbell Associates
www.campbell-associates.co.uk

Microphone Calibration Certificate



Norsonic
Type: 1225

Serial no: 208201

Sensitivity: 52.17 mV/Pa
-25.65 ±0.10 dB re. 1 V/Pa
Capacitance: 22.5 ±1.0 pF
Date: 30/05/2019

Signature: [redacted]

Measurement conditions:

Polarisation voltage:	200.0 V
Pressure:	101.34 ±0.04 kPa
Temperature:	21.8 ±0.1 °C
Relative humidity:	45.6 ±1.3 %RH

Results are normalized to the reference conditions.

Free field response
Pressure (Actuator) response

Campbell Associates
www.campbell-associates.co.uk

Comment:

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
www.campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

CALIBRATION

0789

Certificate of Calibration and Conformance

Certificate number: U32054

Test object:	**Sound Level Meter, BS EN IEC 61672-1:2003 Class 1 (Precision)**
Producer :	**Norsonic**
Type :	**140**
Serial No.:	**1406914**
Customer:	**The Airshed Ltd**
Address:	**5 Lauder Place,**
	East Linton. EH40 3DB.
Contact Person:	**Hilary Fraser**
Order No:	**1907**

Method :
Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. These are based on the procedures for periodic verification of sound level meters as set out in BS EN IEC 61672-3:2006. Results and conformance statement are overleaf and detailed results are in the attached Test Report.

Tested

	Producer:	Type:	Serial No:	Certificate number
Microphone	Norsonic	1225	212990	32053
Calibrator*	Norsonic	1251	31060	U31713
Preamplifier	Norsonic	1209	21121	Included

Additional items that also have been submitted for verification
Wind shield -
Attenuator -
Extension cable -
These items have been taken into account wherever appropriate.

Instruction manual: Im140_1Ed6R3En Firmware version: v4.0.1282 The test object is a single channel instrument.

Conditions	Pressure	Temperature	Humidity
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	99.89 ±0.05 kPa	21.6 ±0.4 °C	45.6 ±0.7 %RH

Date received for calibration: 06/06/2019
Date of calibration: 13/06/2019
Date of issue: 13/06/2019
Engineer

[redacted]
Palanivel Marappan B.Eng (Hons), M.Sc

Supervisor

[redacted]
Darren Batten Tech IOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.
* The calibrator was complete with any required coupler for the microphone specified.

Certificate of Calibration and Conformance

UKAS Laboratory Number 0789

Certificate number: U32054

Conformance

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to BS EN IEC 61672-1:2002 and similarly that the associated sound calibrator conforms to BS EN IEC 60942.

Statement of conformance

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of BS EN IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available[1], from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with BS EN IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in BS EN IEC 61672-1:2002, and that the sound level meter submitted for testing conforms to the class 1 requirements of BS EN IEC 61672-1:2003.

[1] This evidence is held on file at the calibration laboratory

Summary of Measurement Results

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9	Passed
Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14	Passed
Toneburst response - IEC 61672-3 Ed.1 Clause 16	Passed
Peak C sound level - IEC 61672-3 Ed.1 Clause 17	Passed
Overload indication - IEC 61672-3 Ed.1 Clause 18	Passed

Comment

Correct level with associated calibrator is 113.9dB(A).

Observations

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

Calibration Report

Certificate No.:32053

Manufacturer:	**Norsonic**
Type:	**1225**
Serial no:	**212990**

Customer:	**The Airshed Ltd**
Address:	**5 Lauder Place, East Linton. EH40 3DB.**
Order No:	**1907**
Contact Person:	**Hilary Fraser**

Measurement Results:

	Sensitivity: (dB re 1V/Pa)	Capacitance: (pF)
1:	-25.48	23.1
2:	-25.49	23.0
3:	-25.49	23.1
Result (Average):	**-25.49**	**23.1**
Expanded Uncertainty:	0.10	2.01
Degree of Freedom:	>100	>100
Coverage Factor:	2.00	2.00

The following correction factors have been applied during the measurement:
Pressure:-0.001 dB/kPa Temperature:-0.005 dB/°C Relative humidity:0.000 dB/%RH

Reference Calibrator: WSC1 - Nor1253-24269 Volume correction: 0.000 dB
Records:K:\C A\Calibration\Nor-1504\Nor-1017 MicCal\2019\NOR1225_212990_M1.nmf
Measurement procedure: TP05
All results quoted are directly traceable to National Physical Laboratory, London

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA publication EA-4/02.

Comment:

Environmental conditions:

Pressure:	Temperature:	Relative humidity:
99.875 ± 0.042 kPa	21.7 ± 0.1 °C	46.8 ± 1.2 %RH

Date of calibration: 13/06/2019
Date of issue: 13/06/2019

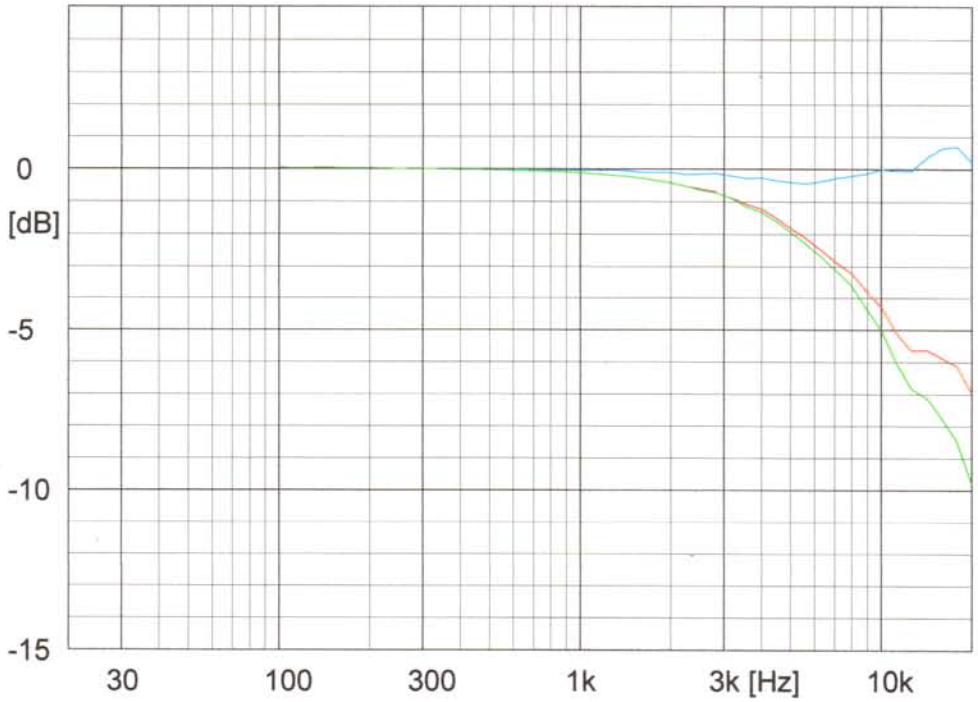
Supervisor : Darren Batten TechIOA
Engineer :

[redacted]

Palanivel Marappan BEng(Hons), MSc
Software version: 6.0h

Campbell Associates
www.campbell-associates.co.uk

Microphone Calibration Certificate



Norsonic
Type: 1225

Serial no: 212990

Sensitivity: 53.17 mV/Pa
-25.49 ±0.10 dB re. 1 V/Pa
Capacitance: 23.1 ±2.0 pF
Date: 13/06/2019

Signature: [redacted]

Measurement conditions:

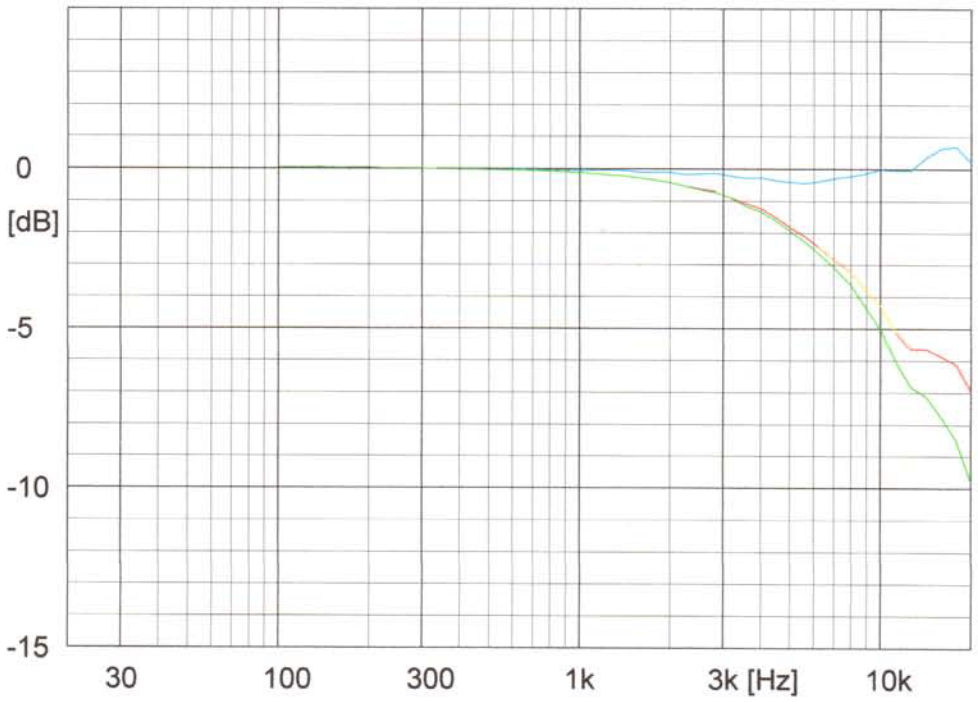
Polarisation voltage:	200.0 V
Pressure:	99.88 ±0.04 kPa
Temperature:	21.7 ±0.1 °C
Relative humidity:	46.8 ±1.2 %RH

Results are normalized to the reference conditions.

Free field response
Diffuse field response
Pressure (Actuator) response

Campbell Associates
www.campbell-associates.co.uk

Microphone Calibration Certificate



Norsonic
Type: 1225

Serial no: 212990

Sensitivity: 53.17 mV/Pa
-25.49 ±0.10 dB re. 1 V/Pa
Capacitance: 23.1 ±2.0 pF
Date: 13/06/2019

Signature: [redacted]

Measurement conditions:

Polarisation voltage:	200.0 V
Pressure:	99.88 ±0.04 kPa
Temperature:	21.7 ±0.1 °C
Relative humidity:	46.8 ±1.2 %RH

Results are normalized to the reference conditions.

Free field response
Diffuse field response
Pressure (Actuator) response

Campbell Associates
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Comment:

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9

```
Reference level: 114.0 dB
Reference Range: 130 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator: WSC5 - Nor1251-31824
Reference calibrator level: 113.99
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.84
Calibrator level before adjustment: 113.8
After calibration:
Environmental corrections: -0.01
Other corrections: -0.15
Notional level: 113.83
Reference calibrator level after calibration: 113.8
Associated Calibrator: Norsonic - 1251 - 31060
Associated calibrator level: 114.06
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.91
Indicated level: 113.9
Final level statement:
Environmental corrections after calibration: -0.01
Other corrections: -0.15
Notional level: 113.90
Calibrator level after adjustment: 113.9
This value shall be used for adjusting the sound level meter in the future.
Test Passed
```

Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2

Network	Level (dB)	Comment
A	15.7	Microphone installed
A	10.2	Equivalent capacity
C	11.9	Equivalent capacity
Z	20.6	Equivalent capacity

Test Passed

Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11

C-Weighted results

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
125 Hz	0.2	0.2	0.0	0.1	0.0	0.1			0.2	+-1.5	0.2	P
1 kHz	0.0	0.3	0.1	0.1	-0.1	0.1			0.3	+-1.1	0.0	P
4 kHz	-1.4	0.3	1.1	0.2	0.0	0.2			0.4	+-1.6	-0.3	P
8 kHz	-3.7	0.3	3.4	0.2	0.0	0.2			0.4	+2.1/-3.1	-0.2	P

The level obtained at 1 kHz was used as reference for the calculations.
This level was: 91.53 dB.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
Frequency response test using electrostatic actuator.
Sources for correction data:
Microphone field corrections and uncertainty: Norsonic AS
Case reflections and uncertainty: Norsonic Cert. CAL022-2011-2849
Wind screen corrections and uncertainty:
Test Passed

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

A-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	P
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	P
250 Hz	-0.1	0.1	0.0	0.1	0.0	0.1			0.19	+-1.4	-0.1	P
500 Hz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.4	0.1	P
1 kHz	0.0	0.1	-0.1	0.1	-0.1	0.1			0.19	+-1.1	-0.2	P
2 kHz	-0.1	0.1	-0.1	0.1	0.1	0.1			0.19	+-1.6	-0.1	P
4 kHz	-0.1	0.1	-0.3	0.2	0.0	0.2			0.31	+-1.6	-0.4	P
8 kHz	0.0	0.1	-0.2	0.2	0.0	0.2			0.31	2.1/3.1	-0.2	P
16 kHz	0.0	0.1	0.6	0.3	-0.1	0.3			0.44	3.5/17	0.5	P

C-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	-0.1	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	-0.1	P
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.5	0.0	P
250 Hz	0.0	0.1	0.0	0.1	0.0	0.1			0.19	+-1.4	0.0	P
500 Hz	0.0	0.1	0.0	0.1	0.1	0.1			0.19	+-1.4	0.1	P
1 kHz	0.0	0.1	-0.1	0.1	-0.1	0.1			0.19	+-1.1	-0.2	P
2 kHz	0.0	0.1	-0.1	0.1	0.1	0.1			0.19	+-1.6	0.0	P
4 kHz	-0.1	0.1	-0.3	0.2	0.0	0.2			0.31	+-1.6	-0.4	P
8 kHz	0.0	0.1	-0.2	0.2	0.0	0.2			0.31	2.1/3.1	-0.2	P
16 kHz	0.0	0.1	0.6	0.3	-0.1	0.3			0.44	3.5/17	0.5	P

Z-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

63 Hz	-0.1	0.1	0.0	0.1	0.0	0.1	0.19	+-1.5	-0.1	P
125 Hz	0.0	0.1	0.0	0.1	0.0	0.1	0.19	+-1.5	0.0	P
250 Hz	0.0	0.1	0.0	0.1	0.0	0.1	0.19	+-1.4	0.0	P
500 Hz	0.0	0.1	0.0	0.1	0.1	0.1	0.19	+-1.4	0.1	P
1 kHz	0.0	0.1	-0.1	0.1	-0.1	0.1	0.19	+-1.1	-0.2	P
2 kHz	0.0	0.1	-0.1	0.1	0.1	0.1	0.19	+-1.6	0.0	P
4 kHz	0.0	0.1	-0.3	0.2	0.0	0.2	0.31	+-1.6	-0.3	P
8 kHz	0.0	0.1	-0.2	0.2	0.0	0.2	0.31	2.1/3.1	-0.2	P
16 kHz	0.0	0.1	0.6	0.3	-0.1	0.3	0.44	3.5/17	0.5	P

The actual frequency response of Norsonic / 1225 212990 has been used for the calculations.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
The calculated uncertainties are checked against the requirements in the standard.
Sources for correction data:
Microphone response and uncertainty: Measured response / Settings fil
Case reflections and uncertainty: Norsonic Cert. CAL022-2011-2849
Test Passed

Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	92.0	0.12	0.0
125.9	92.0	92.0	0.12	0.0
251.2	92.0	91.9	0.12	-0.1
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	91.9	0.12	-0.1
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	91.9	0.12	-0.1
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	91.9	0.12	-0.1
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	92.0	91.9	0.12	-0.1
125.9	92.0	92.0	0.12	0.0
251.2	92.0	92.0	0.12	0.0
501.2	92.0	92.0	0.12	0.0
1000.0	92.0	92.0	0.12	0.0
1995.3	92.0	92.0	0.12	0.0
3981.1	92.0	92.0	0.12	0.0
7943.3	92.0	92.0	0.12	0.0
15848.9	92.0	92.0	0.12	0.0

Test Passed

Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13

Weightings		Ref.	Measured	Lim.		Uncert.	Dev.	Result
Time	Netw	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	
Fast	A	114.0	114.0	0.4	-0.4	0.12	0.0	P
Fast	C	114.0	114.0	0.4	-0.4	0.12	0.0	P
Fast	Z	114.0	114.0	0.4	-0.4	0.12	0.0	P
Slow	A	114.0	114.0	0.3	-0.3	0.12	0.0	P
Leq	A	114.0	114.0	0.3	-0.3	0.12	0.0	P
SEL	A	124.0	124.0	0.3	-0.3	0.12	0.0	P

Test Passed

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Measured at 8 kHz						
114.0	114.0	1.1	-1.1	0.12	0.0	P
119.0	119.0	1.1	-1.1	0.12	0.0	P
124.0	124.0	1.1	-1.1	0.12	0.0	P
129.0	129.0	1.1	-1.1	0.12	0.0	P
131.0	131.0	1.1	-1.1	0.12	0.0	P
132.0	132.0	1.1	-1.1	0.12	0.0	P
133.0	133.0	1.1	-1.1	0.12	0.0	P
134.0	134.0	1.1	-1.1	0.12	0.0	P
135.0	135.0	1.1	-1.1	0.12	0.0	P
136.0	136.0	1.1	-1.1	0.12	0.0	P
114.0	114.0	1.1	-1.1	0.12	0.0	P
109.0	109.0	1.1	-1.1	0.12	0.0	P
104.0	104.0	1.1	-1.1	0.12	0.0	P
99.0	99.0	1.1	-1.1	0.12	0.0	P
94.0	94.0	1.1	-1.1	0.12	0.0	P
89.0	89.0	1.1	-1.1	0.12	0.0	P
84.0	84.0	1.1	-1.1	0.12	0.0	P
79.0	78.9	1.1	-1.1	0.12	-0.1	P
74.0	73.9	1.1	-1.1	0.12	-0.1	P
69.0	68.9	1.1	-1.1	0.12	-0.1	P
64.0	63.9	1.1	-1.1	0.12	-0.1	P

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
59.0	58.9	1.1	-1.1	0.12	-0.1	P
54.0	53.9	1.1	-1.1	0.12	-0.1	P
49.0	48.9	1.1	-1.1	0.12	-0.1	P
44.0	43.9	1.1	-1.1	0.12	-0.1	P
39.0	38.9	1.1	-1.1	0.12	-0.1	P
34.0	34.0	1.1	-1.1	0.12	0.0	P
30.0	30.0	1.1	-1.1	0.12	0.0	P
29.0	29.0	1.1	-1.1	0.12	0.0	P
28.0	28.1	1.1	-1.1	0.12	0.1	P
27.0	27.1	1.1	-1.1	0.12	0.1	P
26.0	26.2	1.1	-1.1	0.12	0.2	P
25.0	25.2	1.1	-1.1	0.12	0.2	P
24.0	24.3	1.1	-1.1	0.12	0.3	P

Test Passed

Toneburst response - IEC 61672-3 Ed.1 Clause 16

Burst type	Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
Fast 200 mSec	134.0	134.0	0.8	-0.8	0.16	0.0	P
Fast 2.0 mSec	117.0	116.8	1.3	-1.8	0.16	-0.2	P
Fast 0.25 mSec	108.0	107.4	1.3	-3.3	0.16	-0.6	P
Slow 200 mSec	127.6	127.6	0.8	-0.8	0.16	0.0	P
Slow 2.0 mSec	108.0	107.9	1.3	-3.3	0.16	-0.1	P
SEL 200 mSec	128.0	128.0	0.8	-0.8	0.16	0.0	P
SEL 2.0 mSec	108.0	107.9	1.3	-1.8	0.16	-0.1	P
SEL 0.25 mSec	99.0	98.8	1.3	-3.3	0.16	-0.2	P

Test Passed

Peak C sound level - IEC 61672-3 Ed.1 Clause 17

Pulse Type	Pulse Freq. (Hz)	Ref. RMS (dB)	Ref. Peak (dB)	Measured Value (dB)	Lim. (+/-dB)	Uncert. (dB)	Dev. (dB)	Result
1 cycle	8k	126.0	129.4	129.1	2.4	0.2	-0.3	P
Pos 1/2 cycle	500	129.0	131.4	131.2	1.4	0.2	-0.2	P
Neg 1/2 cycle	500	129.0	131.4	131.2	1.4	0.2	-0.2	P

Test Passed

Overload indication - IEC 61672-3 Ed.1 Clause 18

	Measured (dB)	Lim. (+/-dB)	Uncert. (dB)	Result
Level difference of positive and negative pulses:	0.1	1.8	0.16	P
Positive 1/2 cycle 4 kHz. Overload occurred at:	138.6			
Negative 1/2 cycle 4 kHz. Overload occurred at:	138.7			

Test Passed

*** End of results ***

Date	Duration	Description	LAeq	LAmax	LA90	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 19:19:45.00)	(0:10:0.0)	Kitchen Door - Open (at source)	52.2	75.0	44.8	60.2	56.0	57.5	54.4	50.4	49.8	49.2	50.4	44.3	47.6	42.4	43.9	45.6	45.3	47.0	44.2	43.0	42.2	41.9	41.0	39.3	37.4	35.1	33.6	32.1	30.4	29.1	26.9	24.6	20.9	16.2
(2021/02/18 19:19:47.00)	(0:10:0.0)	Kitchen Door - open window	38.1	57.8	33.8	48.9	48.9	48.2	41.9	38.6	34.4	37.1	40.9	35.7	34.2	33.2	33.2	33.8	31.0	30.2	29.7	29.8	28.8	27.7	25.8	23.8	21.6	19.4	17.9	15.8	14.0	12.1	9.7	7.9	6.0	5.9

Date	Duration	Description	LAeq	LAmax	LA90	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 17:31:38.00)	(0:5:0.0)	LEV - at source	63.5	64.9	63.0	81.5	79.3	77.2	75.0	72.7	69.5	66.8	61.5	58.4	58.5	58.8	53.5	58.0	55.9	57.6	55.7	58.5	53.2	50.1	49.8	48.0	45.6	42.5	39.5	36.2	32.5	28.6	25.2	23.4	17.6	11.4
(2021/02/18 18:02:30.00)	(0:10:0.0)	LEV - Window Closed	40.0	67.5	25.9	49.2	48.8	45.8	42.7	36.7	33.8	32.1	34.0	29.6	29.6	32.2	30.4	29.8	27.9	33.6	34.9	29.6	29.9	27.3	27.8	29.3	28.3	25.6	21.9	22.8	16.5	14.7	12.3	10.7	7.8	6.7
(2021/02/18 18:14:10.00)	(0:10:0.0)	LEV - Window Open	47.9	77.2	33.3	50.7	52.4	52.9	44.2	41.0	37.7	41.3	45.2	41.4	41.0	38.5	38.7	41.4	39.1	43.2	41.0	42.1	38.8	36.5	34.1	31.9	29.3	27.4	26.5	23.0	20.7	20.2	18.4	15.7	12.6	9.7

Date	Duration	Description	LAeq	LAmax	LA90	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 18:27:34.00)	(0:10:0.0)	Heat Exchanger - Active Window Closed	36.7	62.2	28	54.3	50.1	49.9	44.8	40	40	37.9	37.7	36.3	31.6	34	31.8	29.5	28.9	29.1	27.7	26.7	25.7	25.3	25.1	24.6	23.1	21.6	19.8	17.6	15.8	14.1	12.5	10.7	8.5	7.3
(2021/02/18 18:41:42.00)	(0:10:0.0)	Heat Exchanger - Active Window Open	37.8	60.2	32.9	51.9	45	47.3	41	37.2	35.8	37.6	40.8	37.7	35	37.6	34.2	31.4	29.9	28.5	28.2	28.3	27.2	26.1	25.7	24.2	24.5	21.8	18.8	20.4	14.6	13	11.3	9.9	7.2	6.6
(2021/02/18 17:54:57.00)	(0:1:0.0)	Heat exchanger at source	63.1	83.2	47.6	55.6	50.8	48.8	50.2	52.8	49.6	54	57	59.9	52.1	51.9	51.6	50.1	49.2	50.9	52.3	52.3	50.4	55.2	55.5	50.3	52.7	50.4	43.1	43.9	45.4	39.7	38.7	49.5	43.1	29.1

Date	Duration	Description	LAeq	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 17:31:38.00)	(0:5:0.0)	LEV - On	63.5	81.5	79.3	77.2	75.0	72.7	69.5	66.8	61.5	58.4	58.5	58.8	53.5	58.0	55.9	57.6	55.7	58.5	53.2	50.1	49.8	48.0	45.6	42.5	39.5	36.2	32.5	28.6	25.2	23.4	17.6	11.4
(2021/02/18 17:54:57.00)	(0:1:0.0)	Heat Exchanger	63.1	55.6	50.8	48.8	50.2	52.8	49.6	54.0	57.0	59.9	52.1	51.9	51.6	50.1	49.2	50.9	52.3	52.3	50.4	55.2	55.5	50.3	52.7	50.4	43.1	43.9	45.4	39.7	38.7	49.5	43.1	29.1
(2021/02/18 19:19:45.00)	(0:10:0.0)	Kitchen door open	52.2	60.2	56.0	57.5	54.4	50.4	49.8	49.2	50.4	44.3	47.6	42.4	43.9	45.6	45.3	47.0	44.2	43.0	42.2	41.9	41.0	39.3	37.4	35.1	33.6	32.1	30.4	29.1	26.9	24.6	20.9	16.2

Time	Restaurant	Apartment	Difference	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
(2021/02/18 19:41:02.00)	76.9	37	39.9	14.8	20.5	14.2	17	13.7	13.9	25.8	28.1	32	29.7	38.2	40.1	40.1	46.1	49.5	54	53.9	55.6	56	55.1	55.8	54.9	53.8	52	52.5	52.1	51.8	49.8	50	47.8	37.5
(2021/02/18 19:42:02.00)	76	38.9	37.1	10.9	16.5	12	16.9	13.6	13.3	22.5	30.7	32.2	29.1	37.8	38.9	39.6	46.2	48.2	53.2	53.9	55.5	54.5	54.1	56	54.3	52.9	52.7	51.4	50.5	50.8	48.9	49.2	47	36.5
(2021/02/18 19:43:02.00)	76.4	36.8	39.6	11.8	19.4	14.3	17.5	13.7	13.6	21.8	30.8	31.4	29.9	38	39	38.5	42.3	45.3	51.3	52.9	53.3	53.2	54.3	57.5	56.5	54.2	54.2	52.6	51.1	51.5	49.7	49.6	47.2	37.1
(2021/02/18 19:44:02.00)	76.2	36.7	39.5	12.5	18	12	16.6	13.7	13.7	22.4	30.4	31.8	30	38	39.6	39.4	42.1	48	52.6	53.7	56	56.5	55.4	56.9	55.7	52.9	51.5	51.1	50	50.2	48.3	48.4	46.1	35.3
(2021/02/18 19:45:02.00)	75.8	38.9	36.9	15.6	21.3	16	18.2	13.8	13.5	22	30.5	32	29.7	37.9	39.6	39.2	43.6	47.2	52.5	54.2	56.8	54.4	53.6	55.1	53.5	52.5	52.2	51.2	49.5	50.3	48.7	49.1	46.7	36.2
(2021/02/18 19:46:01.00)	77.7	38	39.7	13.2	20.4	13.5	17.4	14.2	14.3	24	29.1	32.4	29.7	38.2	40.4	39.2	38.4	43.8	50.8	55.9	54.9	49.3	49.2	53	50	49.5	50.3	49.9	49.1	49.8	48.4	48.8	46.8	36.5
(2021/02/18 19:47:02.00)	76.2	39.3	36.9	11.3	17.1	12.2	16.7	14.1	14.2	20.7	31.6	31.4	30	38.5	39.7	39	42.2	44.4	51	51.6	52.3	46.6	50.8	53.3	51.6	52.8	51.4	50.8	49.5	50.5	48.8	49.3	46.9	36.8
(2021/02/18 19:48:02.00)	76.2	38.9	37.3	10.9	13.7	12.2	14.1	14.3	14.4	20.8	32	31.2	30.5	38	38.3	37	38.1	40.5	45.2	46	49.3	45.9	46.2	48.3	48.6	48.5	48.4	48.8	48.5	49.1	47.7	48.4	46.3	35.8

	48977882	5012		30	112	26	50	23	25	380	646	1585	933	6607	10233	10233	40738	89125	251189	245471	363078	398107	323594	380189	309030	239883	158489	177828	162181	151356	95499	100000	60256	5623
	39810717	7762		12	45	16	49	23	21	178	1175	1660	813	6026	7762	9120	41687	66069	208930	245471	354813	281838	257040	398107	269153	194984	186209	138038	112202	120226	77625	83176	50119	4467
	43651583	4786		15	87	27	56	23	23	151	1202	1380	977	6310	7943	7079	16982	33884	134896	194984	213796	208930	269153	562341	446684	263027	263027	181970	128825	141254	93325	91201	52481	5129
	41686938	4677		18	63	16	46	23	23	174	1096	1514	1000	6310	9120	8710	16218	63096	181970	234423	398107	446684	346737	489779	371535	194984	141254	128825	100000	104713	67608	69183	40738	3388
	38018940	7762		36	135	40	66	24	22	158	1122	1585	933	6166	9120	8318	22909	52481	177828	263027	478630	275423	229087	323594	223872	177828	165959	131826	89125	107152	74131	81283	46774	4169
	58884366	6310		21	110	22	55	26	27	251	813	1738	933	6607	10965	8318	6918	23988	120226	389045	309030	85114	83176	199526	100000	89125	107152	97724	81283	95499	69183	75858	47863	4467
	41686938	8511		13	51	17	47	26	26	117	1445	1380	1000	7079	9333	7943	16596	27542	125893	144544	169824	45709	120226	213796	144544	190546	138038	120226	89125	112202	75858	85114	48978	4786
	41686938	7762		12	23	17	26	27	28	120	1585	1318	1122	6310	6761	5012	6457	11220	33113	39811	85114	38905	41687	67608	72444	70795	69183	75858	70795	81283	58884	69183	42658	3802
	76	38																																
				13	**19**	**14**	**17**	**14**	**14**	**23**	**31**	**32**	**30**	**38**	**39**	**39**	**43**	**47**	**52**	**53**	**55**	**53**	**53**	**55**	**54**	**52**	**52**	**51**	**50**	**51**	**49**	**49**	**47**	**37**

adjusted for background

below

(2021/02/18 19:41:02.00)				60.1	58.4	52.3	52.6	68.0	71.1	71.9	74.8	76.9	72.7	76.7	72.8	70.7	67.1	70.6	69.8	66.6	67.7	65.3	64.0	62.4	61.1	59.8	58.1	58.7	58.4	58.3	56.0	55.6	52.6	43.1
(2021/02/18 19:42:02.00)				57.7	53.7	49.5	52.6	68.7	72.0	75.2	80.3	80.4	74.3	74.8	70.7	65.8	65.9	67.3	68.3	66.4	67.0	63.1	63.0	63.4	61.0	59.2	59.0	57.7	56.8	57.2	55.1	54.8	51.8	42.1
(2021/02/18 19:43:02.00)				59.1	57.1	52.0	53.5	68.3	70.7	72.4	77.3	77.5	72.4	71.8	69.0	65.6	62.4	63.8	67.2	68.0	68.2	65.2	64.7	65.5	63.4	60.6	60.6	58.9	57.5	58.0	55.9	55.2	52.0	42.7
(2021/02/18 19:44:02.00)				58.2	54.0	49.7	51.8	66.8	69.7	71.0	74.8	75.4	72.9	77.0	74.2	70.9	61.9	66.6	68.2	65.5	66.6	64.9	63.7	63.7	62.0	59.0	57.8	57.4	56.4	56.7	54.5	54.0	50.9	40.9
(2021/02/18 19:45:02.00)				61.2	59.0	53.8	54.4	68.8	72.2	75.4	80.8	79.8	74.3	74.9	71.7	67.0	64.1	67.0	67.8	66.4	67.3	62.8	62.5	62.3	60.2	59.0	58.6	57.5	55.9	56.8	54.9	54.7	51.5	41.8
(2021/02/18 19:46:01.00)				60.1	57.6	51.2	53.2	68.0	71.7	72.0	78.8	78.4	73.7	75.8	74.4	68.6	60.9	62.4	67.3	72.6	69.3	63.4	63.3	67.2	63.3	60.8	60.7	59.8	57.6	57.5	55.4	55.0	51.8	42.2
(2021/02/18 19:47:02.00)				58.5	53.8	50.0	53.5	70.5	73.9	75.1	82.5	78.7	73.5	74.4	70.9	67.0	63.2	65.6	67.8	68.0	66.1	61.4	63.1	64.6	62.5	62.3	60.2	58.8	56.8	57.5	55.4	55.1	51.8	42.4
(2021/02/18 19:48:02.00)				58.3	53.6	50.4	53.6	70.5	73.4	74.9	82.3	77.7	72.0	72.5	68.3	66.5	64.7	66.2	67.9	67.3	67.7	63.5	64.3	64.9	62.7	60.2	59.1	58.3	56.8	56.8	54.8	54.5	51.4	41.5

above

(2021/02/18 19:41:02.00)				45.3	37.9	38.1	35.6	54.3	57.2	46.1	46.7	44.9	43.0	38.5	32.7	30.6	21.0	21.1	15.8	12.7	12.1	9.3	8.9	6.6	6.2	6.0	6.1	6.2	6.3	6.5	6.2	5.6	4.8	5.6
(2021/02/18 19:42:02.00)				46.8	37.2	37.5	35.7	55.1	58.7	52.7	49.6	48.2	45.2	37.0	31.8	26.2	19.7	19.1	15.1	12.5	11.5	8.6	8.9	7.4	6.7	6.3	6.3	6.3	6.3	6.4	6.2	5.6	4.8	5.6
(2021/02/18 19:43:02.00)				47.3	37.7	37.7	36.0	54.6	57.1	50.6	46.5	46.1	42.5	33.8	30.0	27.1	20.1	18.5	15.9	15.1	14.9	12.0	10.4	8.0	6.9	6.4	6.4	6.3	6.4	6.5	6.2	5.6	4.8	5.6
(2021/02/18 19:44:02.00)				45.7	36.0	37.7	35.2	53.1	56.0	48.6	44.4	43.6	42.9	39.0	34.6	31.5	19.8	18.6	15.6	11.8	10.6	8.4	8.3	6.8	6.3	6.1	6.3	6.3	6.4	6.5	6.2	5.6	4.8	5.6
(2021/02/18 19:45:02.00)				45.6	37.7	37.8	36.2	55.0	58.7	53.4	50.3	47.8	44.6	37.0	32.1	27.8	20.5	19.8	15.3	12.2	10.5	8.4	8.9	7.2	6.7	6.5	6.4	6.3	6.4	6.5	6.2	5.6	4.8	5.6
(2021/02/18 19:46:01.00)				46.9	37.2	37.7	35.8	53.8	57.4	48.0	49.7	46.0	44.0	37.6	34.0	29.4	22.5	18.6	16.5	16.7	14.4	14.1	14.1	14.2	13.3	11.3	10.4	9.9	8.5	7.7	7.0	6.2	5.0	5.7
(2021/02/18 19:47:02.00)				47.2	36.7	37.8	36.8	56.4	59.7	54.4	50.9	47.3	43.5	35.9	31.2	28.0	21.0	21.2	16.8	16.4	13.8	14.8	12.3	11.3	10.9	9.5	8.8	8.0	7.3	7.0	6.6	5.8	4.9	5.6
(2021/02/18 19:48:02.00)				47.4	39.9	38.2	39.5	56.2	59.0	54.1	50.3	46.5	41.5	34.5	30.0	29.5	26.6	25.7	22.7	21.3	18.4	17.6	18.1	16.6	14.1	11.7	10.7	9.5	8.3	7.7	7.1	6.1	5.1	5.7

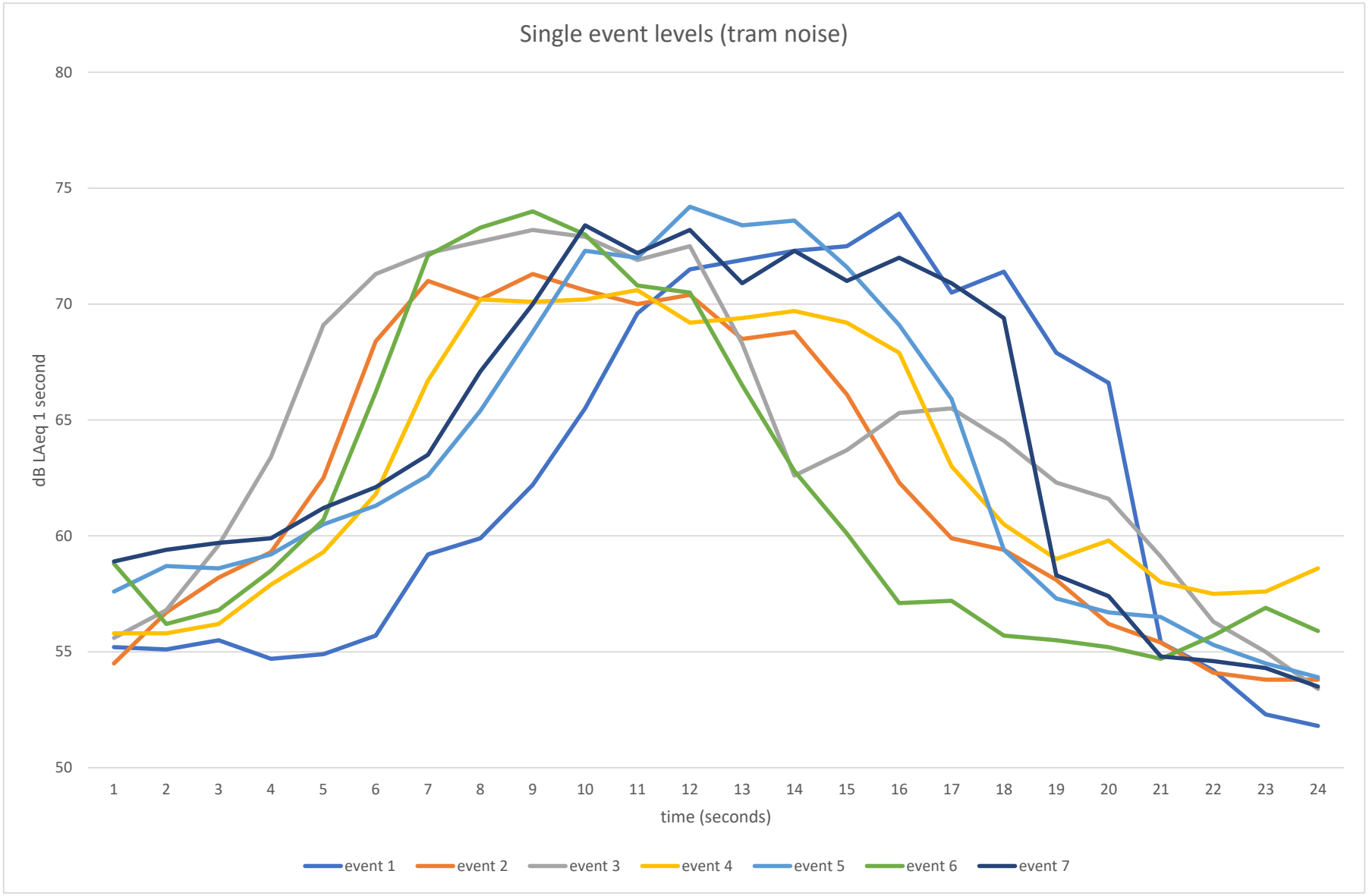
background				54.3	50.1	49.9	44.8	40.0	40.0	37.9	37.7	36.3	31.6	34.0	31.8	29.5	28.9	29.1	27.7	26.7	25.7	25.3	25.1	24.6	23.1	21.6	19.8	17.6	15.8	14.1	12.5	10.7	8.5	7.3
				269153	102329	97724	30200	10000	10000	6166	5888	4266	1445	2512	1514	891	776	813	589	468	372	339	324	288	204	145	95	58	38	26	18	12	7	5

antilog restaurant				1023293	691831	169824	181970	6309573	12882496	15488166	30199517	48977882	18620871	46773514	19054607	11748976	5128614	11481536	9549926	4570882	5888437	3388442	2511886	1737801	1288250	954993	645654	741310	691831	676083	398107	363078	181970	20417
				588844	234423	89125	181970	7413102	15848932	33113112	107151931	109647820	26915348	30199517	11748976	3801894	3890451	5370318	6760830	4365158	5011872	2041738	1995262	2187762	1258925	831764	794328	588844	478630	524807	323594	301995	151356	16218
				812831	512861	158489	223872	6760830	11748976	17378008	53703180	56234133	17378008	15135612	7943282	3630781	1737801	2398833	5248075	6309573	6606934	3311311	2951209	3548134	2187762	1148154	1148154	776247	562341	630957	389045	331131	158489	18621
				660693	251189	93325	151356	4786301	9332543	12589254	30199517	34673685	19498446	50118723	26302680	12302688	1548817	4570882	6606934	3548134	4570882	3090295	2344229	2344229	1584893	794328	602560	549541	436516	467735	281838	251189	123027	12303
				1318257	794328	239883	275423	7585776	16595869	34673685	120226443	95499259	26915348	30902954	14791084	5011872	2570396	5011872	6025596	4365158	5370318	1905461	1778279	1698244	1047129	794328	724436	562341	389045	478630	309030	295121	141254	15136
				1023293	575440	131826	208930	6309573	14791084	15848932	75857758	69183097	23442288	38018940	27542287	7244360	1230269	1737801	5370318	18197009	8511380	2187762	2137962	5248075	2137962	1202264	1174898	954993	575440	562341	346737	316228	151356	16596
				707946	239883	100000	223872	11220185	24547089	32359366	177827941	74131024	22387211	27542287	12302688	5011872	2089296	3630781	6025596	6309573	4073803	1380384	2041738	2884032	1778279	1698244	1047129	758578	478630	562341	346737	323594	151356	17378
				676083	229087	109648	229087	11220185	21877616	30902954	169824365	58884366	15848932	17782794	6760830	4466836	2951209	4168694	6165950	5370318	5888437	2238721	2691535	3090295	1862087	1047129	812831	676083	478630	478630	301995	281838	138038	14125

antilog apartment				33884	6166	6457	3631	269153	524807	40738	46774	30903	19953	7079	1862	1148	126	129	38	19	16	9	8	5	4	4	4	4	4	4	4	3	4
				47863	5248	5623	3715	323594	741310	186209	91201	66069	33113	5012	1514	417	93	81	32	18	14	7	8	5	5	4	4	4	4	4	4	4	3	4
				53703	5888	5888	3981	288403	512861	114815	44668	40738	17783	2399	1000	513	102	71	39	32	31	16	11	6	5	4	4	4	4	4	4	4	3	4
				37154	3981	5888	3311	204174	398107	72444	27542	22909	19498	7943	2884	1413	95	72	36	15	11	7	7	5	4	4	4	4	4	4	4	4	3	4
				36308	5888	6026	4169	316228	741310	218776	107152	60256	28840	5012	1622	603	112	95	34	17	11	7	8	5	5	4	4	4	4	4	4	4	3	4
				48978	5248	5888	3802	239883	549541	63096	93325	39811	25119	5754	2512	871	178	72	45	47	28	26	26	26	21	13	11	10	7	6	5	4	3	4
				52481	4677	6026	4786	436516	933254	275423	123027	53703	22387	3890	1318	631	126	132	48	44	24	30	17	13	12	9	8	6	5	5	5	4	3	4
				54954	9772	6607	8913	416869	794328	257040	107152	44668	14125	2818	1000	891	457	572	186	135	69	58	65	46	26	15	12	9	7	6	5	4	3	4

Average levels																																		
restaurant				59	56	51	53	69	72	74	80	78	73	75	72	68	64	67	68	68	68	64	64	65	62	60	59	58	57	57	55	55	52	42
apartment				47	38	38	37	55	58	52	49	47	44	37	32	29	22	21	18	16	14	13	13	11	10	9	8	8	7	7	6	6	5	6
background				54	50	50	45	40	40	38	38	36	32	34	32	30	29	29	28	27	26	25	25	25	23	22	20	18	16	14	13	11	9	7
apartment background adjusted				-	-	-	-	55	58	52	49	46	43	34	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 2.2 – Baseline Survey of Tram Noise


Single event levels (tram noise)
80
75
70
65
60
55
50
dB LAeq 1 second
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
time (seconds)
event 1
event 2
event 3
event 4
event 5
event 6
event 7

time (seconds)	event 1	event 2	event 3	event 4	event 5	event 6	event 7
1	55.2	54.5	55.6	55.8	57.6	58.8	58.9
2	55.1	56.7	56.8	55.8	58.7	56.2	59.4
3	55.5	58.2	59.6	56.2	58.6	56.8	59.7
4	54.7	59.3	63.4	57.9	59.2	58.5	59.9
5	54.9	62.5	69.1	59.3	60.5	60.7	61.2
6	55.7	68.4	71.3	61.8	61.3	66.2	62.1
7	59.2	71	72.2	66.7	62.6	72.1	63.5
8	59.9	70.2	72.7	70.2	65.4	73.3	67.1
9	62.2	71.3	73.2	70.1	68.8	74	70
10	65.5	70.6	72.9	70.2	72.3	73	73.4
11	69.6	70	71.9	70.6	72	70.8	72.2
12	71.5	70.4	72.5	69.2	74.2	70.5	73.2
13	71.9	68.5	68.3	69.4	73.4	66.5	70.9
14	72.3	68.8	62.6	69.7	73.6	62.8	72.3
15	72.5	66.1	63.7	69.2	71.6	60.1	71
16	73.9	62.3	65.3	67.9	69.1	57.1	72
17	70.5	59.9	65.5	63	65.9	57.2	70.9
18	71.4	59.4	64.1	60.5	59.4	55.7	69.4
19	67.9	58.1	62.3	59	57.3	55.5	58.3
20	66.6	56.2	61.6	59.8	56.7	55.2	57.4
21	55.4	55.4	59.1	58	56.5	54.7	54.8
22	54.2	54.1	56.3	57.5	55.3	55.7	54.6
23	52.3	53.8	55	57.6	54.5	56.9	54.3
24	51.8	53.8	53.4	58.6	53.9	55.9	53.5
SEL	81.6	80.2	82.0	80.0	81.8	81.0	82.2
Averge SEL	81.3						

	LAeq	LAmax	LA90	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
South Tram	64.3	75.4	53.5	63	61	60	62	62	69	74	70	60	58	56	57	58	59	57	55	56	57	52	51	50	44	44	46	37	35	32	27	26	20	18
North Tram	63.0	71.9	53.1	66	64	62	62	63	67	70	68	64	57	57	57	58	57	56	54	54	56	50	50	49	43	43	47	36	35	39	27	24	23	19
South Tram	62.4	74.5	53.9	63	61	61	61	62	65	69	70	59	55	55	55	55	56	55	53	55	56	49	50	48	42	42	45	35	33	28	25	23	16	14
North Tram	61.5	72.2	54.6	74	73	72	71	69	66	66	65	60	56	56	57	56	56	54	52	53	53	49	50	47	46	41	41	32	29	35	23	19	17	15
South Tram	61.3	72.8	52.9	60	60	58	62	65	61	62	62	57	56	55	54	55	54	53	52	54	53	51	51	48	44	42	43	34	32	27	26	25	20	20
North Tram	62.8	74.7	51.7	65	63	61	60	64	65	69	70	63	57	54	55	54	56	55	53	55	56	52	49	49	44	42	43	34	34	30	26	24	19	16
South Tram	65.9	74.7	56.4	68	67	66	68	70	69	75	72	60	59	60	59	57	58	57	55	58	59	56	53	53	49	47	47	40	37	34	30	28	27	21

Appendix 3 – Noise Model Outputs

Constitution Street
Run info
"cooler calibration.sit"

Project description

Project title: Constitution Street
Project No.: AS 0792
Project engineer: Jack
Customer:

Description:
Noise impact assessment for change of use.

Run description

Calculation type: Single Point Sound
Title: "cooler calibration.sit"
Group
Run file: RunFile.runx
Result number: 7
Local calculation (ThreadCount=12)
Calculation start: 12/04/2021 16:01:45
Calculation end: 12/04/2021 16:01:46
Calculation time: 00:00:093 [m:s:ms]
No. of points: 2
No. of calculated points: 2
Kernel version: SoundPLAN 8.2 (07/10/2020) - 32 bit

Run parameters

Reflection order: 3
Maximum reflection distance to receiver 200 m
Maximum reflection distance to source 50 m
Search radius 5000 m
Weighting: dB(A)
Allowed tolerance (per individual source): 0.100 dB
Create ground effect areas from road surfaces: No

Standards:
- Industry: ISO 9613-2: 1996
- Air absorption: ISO 9613-1

regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect

- Limitation of screening loss:
  - single/multiple 20.0 dB /25.0 dB
- Side diffraction: Outdated method (side paths also around terrain)
- Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
- Environment:
  - Air pressure 1013.3 mbar
  - rel. humidity 70.0 %
  - Temperature 10.0 °C
  - Meteo. corr. C0(7-23h)[dB]=0.0; C0(23-7h)[dB]=0.0;
  - Ignore Cmet for Lmax industry calculation: No
- Parameter for screening: C2=20.0

Distance to diameter factor	8
Minimal distance	1 m
Max. difference ground effect + diffraction	1.0 dB
Max. number of iterations	4

Attenuation

Foliage:	ISO 9613-2
Built-up area:	ISO 9613-2
Industrial site:	ISO 9613-2

Assessment: PPG24 (day/night)
Reflection of "own" facade is suppressed

Geometry data

cooler LEV calibration.sit	12/04/2021 16:00:08
- contains:	
calc area.geo	16/11/2020 20:47:00
cooler calibration.geo	12/04/2021 15:18:56
Geo-File1.geo	10/11/2020 23:47:24
Geo-File3.geo	12/04/2021 15:18:12
ground conditions.geo	12/04/2021 15:07:34
LEV calibration.geo	12/04/2021 15:15:30
mastermap.geo	23/02/2021 13:49:48
sources.geo	12/04/2021 16:00:08
RDGM0001.dgm	10/11/2020 23:45:52

Constitution Street
Assessed receiver levels
"cooler calibration.sit"

RNo	Receiver	Fl	Dir	X m	Y m	Z m	LrD dB(A)	LrN dB(A)
1	cooler cal	GF		327175	676207	9.8	50	49
2	LEV cal	GF		327172	676197	16.1	55	27

Constitution Street
Assessed receiver spectra in dB(A) - "cooler calibration.sit"

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver cooler cal Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 50 dB(A) LrN 49 dB(A)									
LrD	25.8	32.8	35.1	40.5	44.6	45.4	39.2	32.7	31.6
LrN	18.7	31.9	33.5	39.1	44.1	45.4	39.1	32.6	31.6
Receiver LEV cal Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 55 dB(A) LrN 27 dB(A)									
LrD	40.1	40.7	45.0	50.2	50.2	43.8	38.8	32.3	20.5
LrN	-3.2	9.9	11.6	17.1	22.1	23.3	16.8	9.6	6.5

Constitution Street
Octave spectra of the sources in dB(A) - "cooler calibration.sit"

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
aircon unit - Facade 01	Area	0.30			62.7	57.5	0.0	0.0		0	100%/24h	Con Street Heat exchanger	27.0	40.2	41.8	47.3	52.4	53.6	47.4	41.0	40.2
LEV	Area	0.07			80.6	68.9	0.0	0.0		0	cooler	Con Street LEV	54.3	54.9	59.1	64.4	64.3	57.9	53.0	46.6	35.1

Constitution Street
Run info
tram calibration

Project description

Project title: Constitution Street
Project No.: AS 0792
Project engineer: Jack
Customer:

Description:
Noise impact assessment for change of use.

Run description

Calculation type: Single Point Sound
Title: tram calibration
Group
Run file: RunFile.runx
Result number: 4
Local calculation (ThreadCount=12)
Calculation start: 12/04/2021 16:01:44
Calculation end: 12/04/2021 16:01:44
Calculation time: 00:00:104 [m:s:ms]
No. of points: 1
No. of calculated points: 1
Kernel version: SoundPLAN 8.2 (07/10/2020) - 32 bit

Run parameters

Reflection order: 3
Maximum reflection distance to receiver 200 m
Maximum reflection distance to source 50 m
Search radius 5000 m
Weighting: dB(A)
Allowed tolerance (per individual source): 0.100 dB
Create ground effect areas from road surfaces: No

Standards:
- Industry: ISO 9613-2: 1996
- Air absorption: ISO 9613-1

regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect

- Limitation of screening loss:
  - single/multiple 20.0 dB /25.0 dB
- Side diffraction: Outdated method (side paths also around terrain)
- Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
- Environment:
  - Air pressure 1013.3 mbar
  - rel. humidity 70.0 %
  - Temperature 10.0 °C
  - Meteo. corr. C0(7-23h)[dB]=0.0; C0(23-7h)[dB]=0.0;
  - Ignore Cmet for Lmax industry calculation: No
- Parameter for screening: C2=20.0

Distance to diameter factor	8
Minimal distance	1 m
Max. difference ground effect + diffraction	1.0 dB
Max. number of iterations	4

Attenuation

Foliage:	ISO 9613-2
Built-up area:	ISO 9613-2
Industrial site:	ISO 9613-2

Assessment: PPG24 (day/night)
Reflection of "own" facade is suppressed

Geometry data

tram calibration.sit	12/04/2021 15:09:12
- contains:	
calc area.geo	16/11/2020 20:47:00
Geo-File1.geo	10/11/2020 23:47:24
ground conditions.geo	12/04/2021 15:07:34
mastermap.geo	23/02/2021 13:49:48
tram calibration.geo	23/02/2021 13:34:38
trams.geo	12/04/2021 15:09:06
RDGM0001.dgm	10/11/2020 23:45:52

Constitution Street
Assessed receiver levels
tram calibration

RNo	Receiver	Usage	Fl	Dir	X m	Y m	Z m	LrD dB(A)
1	tram cal	SCR	GF		327184	676201	9.0	58

Constitution Street
Contribution level - tram calibration

Source	Source group	Source ty	Tr. lane	LrD dB(A)	LrN dB(A)	A dB	
Receiver tram cal Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 58 dB(A) LrN 55 dB(A)							
tram South to North	Default industrial noise	Line		56.0	53.0	0.0	
tram North to South	Default industrial noise	Line		52.8	49.8	0.0	

Constitution Street
Octave spectra of the sources in dB(A) - tram calibration

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
tram North to South	Line	180.16			14.3	36.8	0.0	0.0		0	trams	trams	23.4	25.7	26.6	30.8	32.3	28.4	22.5	11.2	-5.2
tram South to North	Line	180.95			14.3	36.8	0.0	0.0		0	trams	trams	23.5	25.7	26.6	30.8	32.3	28.4	22.5	11.2	-5.2

Constitution Street
Run info
scenario 1

Project description

Project title: Constitution Street
Project No.: AS 0792
Project engineer: Jack
Customer:

Description:
Noise impact assessment for change of use.

Run description

Calculation type: Single Point Sound
Title: scenario 1
Group
Run file: RunFile.runx
Result number: 2
Local calculation (ThreadCount=12)
Calculation start: 12/04/2021 16:01:44
Calculation end: 12/04/2021 16:01:45
Calculation time: 00:00:592 [m:s:ms]
No. of points: 14
No. of calculated points: 14
Kernel version: SoundPLAN 8.2 (07/10/2020) - 32 bit

Run parameters

Reflection order: 3
Maximum reflection distance to receiver 200 m
Maximum reflection distance to source 50 m
Search radius 5000 m
Weighting: dB(A)
Allowed tolerance (per individual source): 0.100 dB
Create ground effect areas from road surfaces: No

Standards:
- Industry: ISO 9613-2: 1996
- Air absorption: ISO 9613-1

regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect

- Limitation of screening loss:
  - single/multiple 20.0 dB /25.0 dB
- Side diffraction: Outdated method (side paths also around terrain)
- Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
- Environment:
  - Air pressure 1013.3 mbar
  - rel. humidity 70.0 %
  - Temperature 10.0 °C
  - Meteo. corr. C0(7-23h)[dB]=0.0; C0(23-7h)[dB]=0.0;
  - Ignore Cmet for Lmax industry calculation: No
- Parameter for screening: C2=20.0

Dissection parameters:

Distance to diameter factor	8
Minimal distance	1 m
Max. difference ground effect + diffraction	1.0 dB
Max. number of iterations	4

Attenuation

Foliage:	ISO 9613-2
Built-up area:	ISO 9613-2
Industrial site:	ISO 9613-2

Assessment: PPG24 (day/night)

Reflection of "own" facade is suppressed

Geometry data

Scenario 1.sit	12/04/2021 15:28:02
- contains:	
calc area.geo	16/11/2020 20:47:00
existing buildings.geo	23/02/2021 15:23:18
Geo-File1.geo	10/11/2020 23:47:24
ground conditions.geo	12/04/2021 15:07:34
mastermap.geo	23/02/2021 13:49:48
receptors.geo	12/04/2021 15:20:12
sources.geo	12/04/2021 16:00:08
RDGM0001.dgm	10/11/2020 23:45:52

Constitution Street
Assessed receiver levels
scenario 1

RNo	Receiver	Fl	Dir	X m	Y m	Z m	LrD dB(A)	LrN dB(A)
2	100 - west of site courtyard	GF	SE	327174	676214	9.4	34	26
		F 1				11.9	33	26
		F 2				14.4	35	25
		F 3				16.9	37	24
3	102-104 constitution street	GF	NE	327168	676201	9.2	44	35
		F 1				11.7	46	35
1	94 constitution street	GF	SW	327180	676223	8.8	27	21
		F 1				11.3	28	21
		F 2				13.8	31	21
4	houses rear	GF	SE	327169	676205	9.2	40	36
		F 1				11.7	41	36
5	north of site site 1st floor	GF	SE	327187	676212	13.1	27	6
6	site 1st floor	GF	NW	327172	676203	13.1	44	36
~~7~~	~~site 1st floor~~	~~GF~~	~~NW~~	~~327171~~	~~676201~~	~~13.1~~	~~46~~	~~34~~
8	site 1st floor	GF	SE	327184	676207	13.1	28	8
9	site 1st floor	GF	SE	327180	676199	13.1	30	7
10	site 1st floor	GF	SE	327178	676196	13.1	29	7
11	site 1st floor	GF	SE	327185	676209	13.1	27	8
12	site 1st floor archway back	GF	NW	327174	676206	13.1	43	39
13	site 1st floor archway front	GF	SE	327182	676202	13.1	29	8
14	south of site 1st floor	GF	SE	327174	676188	13.1	29	5

Constitution Street
Assessed receiver spectra in dB(A) - scenario 1

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver 100 - west of site courtyard Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 34 dB(A) LrN 26 dB(A)									
LrD	20.9	20.2	24.1	29.1	29.4	25.3	19.2	11.3	2.9
LrN	-11.7	2.5	5.5	15.3	21.6	22.9	16.1	7.9	2.4
Receiver 100 - west of site courtyard Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 33 dB(A) LrN 26 dB(A)									
LrD	17.6	18.4	22.6	28.0	28.9	25.3	19.7	12.9	3.4
LrN	-10.8	3.5	6.2	15.6	21.4	22.7	15.8	7.5	1.9
Receiver 100 - west of site courtyard Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 35 dB(A) LrN 25 dB(A)									
LrD	18.1	19.1	23.6	29.5	31.2	27.3	21.8	14.2	2.6
LrN	-10.4	4.3	4.5	12.5	19.9	21.5	14.6	6.2	0.4
Receiver 100 - west of site courtyard Fl F 3 LrD,lim dB(A) LrN,lim dB(A) LrD 37 dB(A) LrN 24 dB(A)									
LrD	18.3	19.7	25.2	32.5	33.2	27.8	22.2	14.2	2.3
LrN	-10.5	4.7	5.5	13.0	19.3	21.1	14.3	5.9	-0.1
Receiver 102-104 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 44 dB(A) LrN 35 dB(A)									
LrD	27.8	28.8	32.9	38.4	39.0	34.6	28.9	21.6	14.8
LrN	4.3	17.7	19.2	24.5	29.5	30.7	24.2	17.0	14.1
Receiver 102-104 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 46 dB(A) LrN 35 dB(A)									
LrD	30.1	31.0	35.4	41.3	41.8	36.6	31.6	25.6	16.5
LrN	4.5	18.1	19.6	24.9	29.7	30.8	24.2	16.9	14.0
Receiver 94 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 21 dB(A)									
LrD	11.1	10.1	12.3	20.9	23.3	19.4	13.5	5.8	-4.9
LrN	-20.0	-3.1	-3.3	10.7	16.0	16.9	9.9	1.2	-6.1
Receiver 94 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 28 dB(A) LrN 21 dB(A)									
LrD	12.5	12.1	14.7	22.3	24.5	20.7	15.7	7.2	-4.8
LrN	-19.1	-2.0	-1.7	11.0	16.1	17.0	10.0	1.2	-6.1
Receiver 94 constitution street Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 31 dB(A) LrN 21 dB(A)									
LrD	16.0	16.3	19.5	25.3	27.2	22.3	16.2	7.7	-4.7
LrN	-18.3	-1.0	-0.2	11.3	16.5	17.3	10.2	1.3	-6.1
Receiver houses rear Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 40 dB(A) LrN 36 dB(A)									
LrD	23.0	24.5	28.3	33.9	35.4	33.4	27.4	20.3	16.3
LrN	4.5	18.2	20.4	25.8	30.8	31.9	25.5	18.4	16.2
Receiver houses rear Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 41 dB(A) LrN 36 dB(A)									
LrD	23.7	25.3	29.6	35.7	37.1	33.9	28.3	21.8	16.3
LrN	4.3	18.1	20.4	25.7	30.6	31.7	25.3	18.2	15.9
Receiver north of site site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 6 dB(A)									
LrD	14.4	15.6	18.5	22.3	21.3	14.2	7.8	-1.7	-14.9
LrN	-16.9	-5.4	-7.4	-3.4	1.1	2.3	-4.0	-11.9	-16.2
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 44 dB(A) LrN 36 dB(A)									
LrD	30.3	30.6	33.6	38.8	39.1	34.5	28.3	20.8	16.1
LrN	5.2	18.4	20.1	25.4	30.5	31.7	25.2	18.1	15.9

Constitution Street
Assessed receiver spectra in dB(A) - scenario 1

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 46 dB(A) LrN 34 dB(A)									
~~LrD~~	~~33.8~~	~~32.7~~	~~36.8~~	~~41.8~~	~~41.4~~	~~35.5~~	~~29.5~~	~~21.8~~	~~14.6~~
~~LrN~~	~~2.9~~	~~16.4~~	~~17.9~~	~~23.7~~	~~29.2~~	~~30.5~~	~~24.0~~	~~16.7~~	~~13.8~~
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 28 dB(A) LrN 8 dB(A)									
LrD	16.1	16.6	19.6	23.3	22.2	15.2	8.9	-0.4	-12.5
LrN	-13.7	-2.7	-4.1	-1.6	2.7	3.9	-2.5	-10.2	-13.8
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 30 dB(A) LrN 7 dB(A)									
LrD	19.7	18.9	21.5	25.0	23.6	15.9	9.9	1.3	-11.7
LrN	-15.2	-4.4	-6.2	-3.1	1.4	2.4	-4.2	-11.9	-15.2
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 7 dB(A)									
LrD	20.8	19.3	21.2	23.8	21.6	13.8	8.2	0.6	-11.2
LrN	-15.2	-4.5	-5.8	-2.8	1.6	2.6	-3.6	-11.2	-15.5
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 8 dB(A)									
LrD	15.1	16.1	19.0	22.7	21.7	14.7	8.4	-1.0	-13.7
LrN	-15.2	-3.8	-5.6	-2.2	2.1	3.2	-3.2	-11.0	-15.0
Receiver site 1st floor archway back Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 43 dB(A) LrN 39 dB(A)									
LrD	27.3	28.9	32.0	37.4	38.5	36.0	29.8	22.6	19.9
LrN	7.5	21.8	23.5	28.9	33.8	34.8	28.3	21.5	19.8
Receiver site 1st floor archway front Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 8 dB(A)									
LrD	18.3	17.7	20.5	24.1	22.8	15.3	9.1	0.3	-11.6
LrN	-13.0	-2.1	-3.4	-1.5	2.6	3.7	-2.9	-10.3	-13.4
Receiver south of site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 5 dB(A)									
LrD	18.6	17.5	20.2	23.8	23.7	16.4	10.4	1.5	-13.3
LrN	-18.4	-6.6	-8.4	-4.8	0.0	1.3	-5.3	-13.6	-19.1

Constitution Street
Mean propagation Leq - scenario 1

Source	Source type	Time slice	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
Receiver 100 - west of site courtyard Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 34 dB(A) LrN 26 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	5.99	-26.5	3.0	-24.7	-0.1		0.0	17.1	26.3	0.0	0.0	0.0	26.3
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	5.99	-26.5	3.0	-24.7	-0.1		0.0	17.1	26.3	0.0	0.0	0.0	26.3
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	17.65	-35.9	3.0	-2.6	-0.1		0.0	0.2	33.5	0.0	0.0	0.0	33.5
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	17.65	-35.9	3.0	-2.6	-0.1		0.0	0.2	33.5		0.0		
Receiver 100 - west of site courtyard Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 33 dB(A) LrN 26 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	6.32	-27.0	3.0	-24.5	-0.1		0.0	17.2	26.2	0.0	0.0	0.0	26.2
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	6.32	-27.0	3.0	-24.5	-0.1		0.0	17.2	26.2	0.0	0.0	0.0	26.2
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	16.90	-35.6	3.0	-4.3	-0.1		0.0	0.5	32.5	0.0	0.0	0.0	32.5
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	16.90	-35.6	3.0	-4.3	-0.1		0.0	0.5	32.5		0.0		
Receiver 100 - west of site courtyard Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 35 dB(A) LrN 25 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	7.52	-28.5	3.0	-24.1	-0.1		0.0	16.9	24.7	0.0	0.0	0.0	24.7
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	7.52	-28.5	3.0	-24.1	-0.1		0.0	16.9	24.7	0.0	0.0	0.0	24.7
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	16.51	-35.3	3.0	-2.4	-0.1		0.0	0.7	34.8	0.0	0.0	0.0	34.8
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	16.51	-35.3	3.0	-2.4	-0.1		0.0	0.7	34.8		0.0		
Receiver 100 - west of site courtyard Fl F 3 LrD,lim dB(A) LrN,lim dB(A) LrD 37 dB(A) LrN 24 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.25	-30.3	3.0	-20.8	-0.1		0.0	15.1	24.4	0.0	0.0	0.0	24.4
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.25	-30.3	3.0	-20.8	-0.1		0.0	15.1	24.4	0.0	0.0	0.0	24.4
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	16.49	-35.3	3.0	-0.6	-0.1		0.0	1.0	36.9	0.0	0.0	0.0	36.9
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	16.49	-35.3	3.0	-0.6	-0.1		0.0	1.0	36.9		0.0		
Receiver 102-104 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 44 dB(A) LrN 35 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.70	-30.7	3.0	0.0	-0.1		0.0	4.9	34.5	0.0	0.0	0.0	34.5
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.70	-30.7	3.0	0.0	-0.1		0.0	4.9	34.5	0.0	0.0	0.0	34.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	7.53	-28.5	3.0	-5.1	0.0		0.0	4.6	42.9	0.0	0.0	0.0	42.9
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	7.53	-28.5	3.0	-5.1	0.0		0.0	4.6	42.9		0.0		
Receiver 102-104 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 46 dB(A) LrN 35 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.87	-30.9	3.0	0.0	-0.1		0.0	5.2	34.7	0.0	0.0	0.0	34.7
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.87	-30.9	3.0	0.0	-0.1		0.0	5.2	34.7	0.0	0.0	0.0	34.7
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	5.49	-25.8	3.0	-4.6	0.0		0.0	4.3	45.8	0.0	0.0	0.0	45.8
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	5.49	-25.8	3.0	-4.6	0.0		0.0	4.3	45.8		0.0		
Receiver 94 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 21 dB(A)																					

Constitution Street
Mean propagation Leq - scenario 1

Source	Source type	Time slice	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	16.08	-35.1	3.0	-24.7	-0.2		0.0	20.1	20.5	0.0	0.0	0.0	20.5
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	16.08	-35.1	3.0	-24.7	-0.2		0.0	20.1	20.5	0.0	0.0	0.0	20.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	28.03	-39.9	3.0	-15.0	-0.1		0.0	9.0	25.9	0.0	0.0	0.0	25.9
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	28.03	-39.9	3.0	-15.0	-0.1		0.0	9.0	25.9		0.0		
Receiver 94 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 28 dB(A) LrN 21 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	16.11	-35.1	3.0	-24.7	-0.2		0.0	20.1	20.6	0.0	0.0	0.0	20.6
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	16.11	-35.1	3.0	-24.7	-0.2		0.0	20.1	20.6	0.0	0.0	0.0	20.6
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	27.51	-39.8	3.0	-12.6	-0.1		0.0	8.0	27.5	0.0	0.0	0.0	27.5
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	27.51	-39.8	3.0	-12.6	-0.1		0.0	8.0	27.5		0.0		
Receiver 94 constitution street Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 31 dB(A) LrN 21 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	16.52	-35.4	3.0	-24.5	-0.2		0.0	20.6	21.0	0.0	0.0	0.0	21.0
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	16.52	-35.4	3.0	-24.5	-0.2		0.0	20.6	21.0	0.0	0.0	0.0	21.0
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	27.21	-39.7	3.0	-6.1	-0.1		0.0	4.5	30.6	0.0	0.0	0.0	30.6
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	27.21	-39.7	3.0	-6.1	-0.1		0.0	4.5	30.6		0.0		
Receiver houses rear Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 40 dB(A) LrN 36 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	6.85	-27.7	3.0	0.0	-0.1		0.0	3.1	35.8	0.0	0.0	0.0	35.8
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	6.85	-27.7	3.0	0.0	-0.1		0.0	3.1	35.8	0.0	0.0	0.0	35.8
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	10.08	-31.1	3.0	-4.1	0.0		0.0	1.3	38.0	0.0	0.0	0.0	38.0
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	10.08	-31.1	3.0	-4.1	0.0		0.0	1.3	38.0		0.0		
Receiver houses rear Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 41 dB(A) LrN 36 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	7.07	-28.0	3.0	0.0	-0.1		0.0	3.2	35.6	0.0	0.0	0.0	35.6
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	7.07	-28.0	3.0	0.0	-0.1		0.0	3.2	35.6	0.0	0.0	0.0	35.6
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	8.66	-29.7	3.0	-3.1	0.0		0.0	1.0	40.0	0.0	0.0	0.0	40.0
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	8.66	-29.7	3.0	-3.1	0.0		0.0	1.0	40.0		0.0		
Receiver north of site site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 6 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	12.75	-33.1	3.0	-24.6	-0.2		0.0	3.8	6.5	0.0	0.0	0.0	6.5
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	12.75	-33.1	3.0	-24.6	-0.2		0.0	3.8	6.5	0.0	0.0	0.0	6.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	21.68	-37.7	3.0	-13.1	0.0		0.0	5.8	26.8	0.0	0.0	0.0	26.8
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	21.68	-37.7	3.0	-13.1	0.0		0.0	5.8	26.8		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 44 dB(A) LrN 36 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	6.21	-26.9	3.0	0.0	-0.1		0.0	1.9	35.5	0.0	0.0	0.0	35.5

Constitution Street
Mean propagation Leq - scenario 1

Source	Source type	Time slice	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	6.21	-26.9	3.0	0.0	-0.1		0.0	1.9	35.5	0.0	0.0	0.0	35.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	6.57	-27.3	3.0	-3.0	0.0		0.0	1.6	43.2	0.0	0.0	0.0	43.2
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	6.57	-27.3	3.0	-3.0	0.0		0.0	1.6	43.2		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 46 dB(A) LrN 34 dB(A)																					
~~aircon unit - Facade 01~~	~~Area~~	~~LrD~~	~~62.7~~	~~57.5~~	~~0.3~~	~~0.0~~	~~0.0~~	~~0~~	~~8.86~~	~~-29.9~~	~~3.0~~	~~0.0~~	~~-0.1~~		~~0.0~~	~~3.7~~	~~34.2~~	~~0.0~~	~~0.0~~	~~0.0~~	~~34.2~~
~~aircon unit - Facade 01~~	~~Area~~	~~LrN~~	~~62.7~~	~~57.5~~	~~0.3~~	~~0.0~~	~~0.0~~	~~0~~	~~8.86~~	~~-29.9~~	~~3.0~~	~~0.0~~	~~-0.1~~		~~0.0~~	~~3.7~~	~~34.2~~	~~0.0~~	~~0.0~~	~~0.0~~	~~34.2~~
~~LEV~~	~~Area~~	~~LrD~~	~~80.6~~	~~68.9~~	~~0.1~~	~~0.0~~	~~0.0~~	~~0~~	~~4.15~~	~~-23.4~~	~~3.0~~	~~-3.2~~	~~0.0~~		~~0.0~~	~~0.8~~	~~46.1~~	~~0.0~~	~~0.0~~	~~0.0~~	~~46.1~~
~~LEV~~	~~Area~~	~~LrN~~	~~80.6~~	~~68.9~~	~~0.1~~	~~0.0~~	~~0.0~~	~~0~~	~~4.15~~	~~-23.4~~	~~3.0~~	~~-3.2~~	~~0.0~~		~~0.0~~	~~0.8~~	~~46.1~~		~~0.0~~		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 28 dB(A) LrN 8 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.68	-30.7	3.0	-24.5	-0.1		0.0	3.0	8.3	0.0	0.0	0.0	8.3
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.68	-30.7	3.0	-24.5	-0.1		0.0	3.0	8.3	0.0	0.0	0.0	8.3
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	16.72	-35.5	3.0	-13.7	0.0		0.0	5.1	27.9	0.0	0.0	0.0	27.9
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	16.72	-35.5	3.0	-13.7	0.0		0.0	5.1	27.9		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 30 dB(A) LrN 7 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	10.55	-31.5	3.0	-24.5	-0.1		0.0	2.3	6.7	0.0	0.0	0.0	6.7
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	10.55	-31.5	3.0	-24.5	-0.1		0.0	2.3	6.7	0.0	0.0	0.0	6.7
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	9.86	-30.9	3.0	-14.4	0.0		0.0	3.1	29.8	0.0	0.0	0.0	29.8
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	9.86	-30.9	3.0	-14.4	0.0		0.0	3.1	29.8		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 7 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	12.81	-33.1	3.0	-24.5	-0.2		0.0	4.3	7.0	0.0	0.0	0.0	7.0
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	12.81	-33.1	3.0	-24.5	-0.2		0.0	4.3	7.0	0.0	0.0	0.0	7.0
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	8.34	-29.4	3.0	-14.4	0.0		0.0	1.0	29.1	0.0	0.0	0.0	29.1
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	8.34	-29.4	3.0	-14.4	0.0		0.0	1.0	29.1		0.0		
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 27 dB(A) LrN 8 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	10.98	-31.8	3.0	-24.5	-0.1		0.0	3.5	7.5	0.0	0.0	0.0	7.5
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	10.98	-31.8	3.0	-24.5	-0.1		0.0	3.5	7.5	0.0	0.0	0.0	7.5
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	19.17	-36.6	3.0	-13.4	0.0		0.0	5.4	27.3	0.0	0.0	0.0	27.3
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	19.17	-36.6	3.0	-13.4	0.0		0.0	5.4	27.3		0.0		
Receiver site 1st floor archway back Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 43 dB(A) LrN 39 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	3.78	-22.5	3.0	0.0	-0.1		0.0	0.8	38.7	0.0	0.0	0.0	38.7
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	3.78	-22.5	3.0	0.0	-0.1		0.0	0.8	38.7	0.0	0.0	0.0	38.7

Constitution Street
Mean propagation Leq - scenario 1

Source	Source type	Time slice	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	9.74	-30.8	3.0	-2.7	0.0		0.0	2.9	41.2	0.0	0.0	0.0	41.2
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	9.74	-30.8	3.0	-2.7	0.0		0.0	2.9	41.2		0.0		
Receiver site 1st floor archway front Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 8 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	9.15	-30.2	3.0	-24.5	-0.1		0.0	2.5	8.2	0.0	0.0	0.0	8.2
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	9.15	-30.2	3.0	-24.5	-0.1		0.0	2.5	8.2	0.0	0.0	0.0	8.2
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	12.49	-32.9	3.0	-14.1	0.0		0.0	3.9	28.8	0.0	0.0	0.0	28.8
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	12.49	-32.9	3.0	-14.1	0.0		0.0	3.9	28.8		0.0		
Receiver south of site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 29 dB(A) LrN 5 dB(A)																					
aircon unit - Facade 01	Area	LrD	62.7	57.5	0.3	0.0	0.0	0	19.90	-37.0	3.0	-24.6	-0.2		0.0	6.6	5.3	0.0	0.0	0.0	5.3
aircon unit - Facade 01	Area	LrN	62.7	57.5	0.3	0.0	0.0	0	19.90	-37.0	3.0	-24.6	-0.2		0.0	6.6	5.3	0.0	0.0	0.0	5.3
LEV	Area	LrD	80.6	68.9	0.1	0.0	0.0	0	10.47	-31.4	3.0	-14.4	0.0		0.0	2.8	29.0	0.0	0.0	0.0	29.0
LEV	Area	LrN	80.6	68.9	0.1	0.0	0.0	0	10.47	-31.4	3.0	-14.4	0.0		0.0	2.8	29.0		0.0		

Constitution Street
Octave spectra of the sources in dB(A) - scenario 1

Name	Source type	X	Y	Z	l or A	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
		m	m	m	m,m²	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
aircon unit - Facade 01	Area	327175	676208	9.8	0.30	62.7	57.5	0.0	0.0		0	100%/24h	Con Street Heat exchanger	27.0	40.2	41.8	47.3	52.4	53.6	47.4	41.0
LEV	Area	327170	676197	15.8	0.07	80.6	68.9	0.0	0.0		0	cooler	Con Street LEV	54.3	54.9	59.1	64.4	64.3	57.9	53.0	46.6

Constitution Street
Run info
"Scenario 2.sit"

Project description

Project title: Constitution Street
Project No.: AS 0792
Project engineer: Jack
Customer:

Description:
Noise impact assessment for change of use.

Run description

Calculation type: Single Point Sound
Title: "Scenario 2.sit"
Group
Run file: RunFile.runx
Result number: 5
Local calculation (ThreadCount=12)
Calculation start: 12/04/2021 16:00:19
Calculation end: 12/04/2021 16:00:23
Calculation time: 00:03:416 [m:s:ms]
No. of points: 14
No. of calculated points: 14
Kernel version: SoundPLAN 8.2 (07/10/2020) - 32 bit

Run parameters

Reflection order: 3
Maximum reflection distance to receiver 200 m
Maximum reflection distance to source 50 m
Search radius 5000 m
Weighting: dB(A)
Allowed tolerance (per individual source): 0.100 dB
Create ground effect areas from road surfaces: No

Standards:
- Road: CoRTN: 1988
  - Driving on right side
  - Emission according to: CoRTN
  - Reflection order limited to: 1
  - Road gradient smoothed with smooth length of: 15 m
  - Disable low flow correction: No
  - Method for L10 to Leq conversion: TRL formula
  - Side diffraction: disabled
  - Attenuation
    - Foliage: No attenuation
    - Built-up area: No attenuation
    - Industrial site: No attenuation
- Industry: ISO 9613-2: 1996

Air absorption: ISO 9613-1
regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect
Limitation of screening loss:
single/multiple 20.0 dB /25.0 dB
Side diffraction: Outdated method (side paths also around terrain)
Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
Environment:
Air pressure 1013.3 mbar
rel. humidity 70.0 %
Temperature 10.0 °C
Meteo. corr. C0(7-23h)[dB]=0.0; C0(23-7h)[dB]=0.0;
Ignore Cmet for Lmax industry calculation: No
Parameter for screening: C2=20.0
Dissection parameters:
Distance to diameter factor 8
Minimal distance 1 m
Max. difference ground effect + diffraction 1.0 dB
Max. number of iterations 4
Attenuation
Foliage: ISO 9613-2
Built-up area: ISO 9613-2
Industrial site: ISO 9613-2

Assessment: PPG24 (day/night)
Reflection of "own" facade is suppressed

Geometry data

Scenario 2.sit	23/02/2021 15:23:58
- contains:	
calc area.geo	16/11/2020 20:47:00
existing buildings.geo	23/02/2021 15:23:18
Geo-File1.geo	10/11/2020 23:47:24
ground conditions.geo	12/04/2021 15:07:34
mastermap.geo	23/02/2021 13:49:48
receptors.geo	12/04/2021 15:20:12
roads.geo	23/02/2021 15:20:16
trams.geo	12/04/2021 15:09:06
RDGM0001.dgm	10/11/2020 23:45:52

Constitution Street
Assessed receiver levels
"Scenario 2.sit"

2

RNo	Receiver	Usage	Fl	Dir	X m	Y m	Z m	LrD dB(A)
1	94 constitution street	SCR	GF	SW	327180	676223	8.8	34.1
			F 1				11.3	35.7
			F 2				13.8	37.9
2	100 - west of site courtyard	SCR	GF	SE	327174	676214	9.4	35.7
			F 1				11.9	37.2
			F 2				14.4	39.7
			F 3				16.9	43.9
3	102-104 constitution street	SCR	GF	NE	327168	676201	9.2	36.6
			F 1				11.7	38.4
4	houses rear	SCR	GF	SE	327169	676205	9.2	36.2
			F 1				11.7	37.9
5	north of site site 1st floor	SCR	GF	SE	327187	676212	13.1	57.8
6	site 1st floor	SCR	GF	NW	327172	676203	13.1	39.0
7	site 1st floor	SCR	GF	NW	327171	676201	13.1	39.0
8	site 1st floor	SCR	GF	SE	327184	676207	13.1	57.9
9	site 1st floor	SCR	GF	SE	327180	676199	13.1	57.4
10	site 1st floor	SCR	GF	SE	327178	676196	13.1	57.4
11	site 1st floor	SCR	GF	SE	327185	676209	13.1	57.9
12	site 1st floor archway back	SCR	GF	NW	327174	676206	13.1	38.9
13	site 1st floor archway front	SCR	GF	SE	327182	676202	13.1	57.8
14	south of site 1st floor	SCR	GF	SE	327174	676188	13.1	57.7

Constitution Street
Assessed receiver spectra in dB(A) - "Scenario 2.sit"

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver 94 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 34.1 dB(A) LrN 27.7 dB(A)									
LrD	22.3	22.5	20.9	32.1	24.8	21.1	14.4	0.3	-21.7
LrN	19.3	19.5	17.9	20.6	21.8	18.1	11.4	-2.7	-24.7
Receiver 94 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 35.7 dB(A) LrN 28.3 dB(A)									
LrD	23.7	23.9	22.1	34.1	24.6	20.7	14.0	0.0	-21.9
LrN	20.7	20.9	19.1	21.1	21.6	17.7	11.0	-3.0	-24.9
Receiver 94 constitution street Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 37.9 dB(A) LrN 30.2 dB(A)									
LrD	25.9	26.4	24.7	36.5	25.6	20.7	13.7	-0.3	-22.3
LrN	22.9	23.4	21.7	23.4	22.6	17.7	10.7	-3.3	-25.3
Receiver 100 - west of site courtyard Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 35.7 dB(A) LrN 29.4 dB(A)									
LrD	24.2	25.1	22.8	33.7	26.1	22.2	15.5	1.6	-20.5
LrN	21.2	22.1	19.8	22.1	23.1	19.2	12.5	-1.4	-23.5
Receiver 100 - west of site courtyard Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 37.2 dB(A) LrN 29.8 dB(A)									
LrD	25.9	26.1	23.8	35.6	25.5	21.3	14.7	0.6	-21.5
LrN	22.9	23.1	20.8	22.4	22.5	18.3	11.7	-2.4	-24.5
Receiver 100 - west of site courtyard Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 39.7 dB(A) LrN 32.2 dB(A)									
LrD	28.4	28.9	26.9	38.3	27.0	21.4	14.2	0.2	-21.9
LrN	25.4	25.9	23.9	25.3	24.0	18.4	11.2	-2.8	-24.9
Receiver 100 - west of site courtyard Fl F 3 LrD,lim dB(A) LrN,lim dB(A) LrD 43.9 dB(A) LrN 38.0 dB(A)									
LrD	29.9	31.4	32.1	42.0	35.7	30.2	22.1	6.3	-17.9
LrN	26.9	28.4	29.1	32.5	32.7	27.2	19.1	3.3	-20.9
Receiver 102-104 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 36.6 dB(A) LrN 30.9 dB(A)									
LrD	26.3	27.0	24.6	34.1	27.3	23.4	16.8	2.8	-19.5
LrN	23.3	24.0	21.6	23.3	24.3	20.4	13.8	-0.2	-22.5
Receiver 102-104 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 38.4 dB(A) LrN 32.1 dB(A)									
LrD	28.0	28.8	26.6	36.4	27.3	23.1	16.5	2.5	-19.8
LrN	25.0	25.8	23.6	24.7	24.3	20.1	13.5	-0.5	-22.8
Receiver houses rear Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 36.2 dB(A) LrN 29.7 dB(A)									
LrD	24.9	25.7	23.6	34.3	25.9	22.1	15.5	1.1	-21.6
LrN	21.9	22.7	20.6	22.2	22.9	19.1	12.5	-1.9	-24.6
Receiver houses rear Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 37.9 dB(A) LrN 30.7 dB(A)									
LrD	26.4	27.4	25.2	36.3	25.8	21.6	14.9	0.7	-21.9
LrN	23.4	24.4	22.2	23.4	22.8	18.6	11.9	-2.3	-24.9
Receiver north of site site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.8 dB(A) LrN 51.0 dB(A)									
LrD	37.9	40.8	43.2	56.2	49.8	46.4	40.5	28.0	8.9
LrN	34.9	37.8	40.2	45.0	46.8	43.4	37.5	25.0	5.9
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 39.0 dB(A) LrN 32.1 dB(A)									
LrD	28.1	28.8	26.7	37.3	27.0	22.4	15.7	1.7	-20.2
LrN	25.1	25.8	23.7	24.8	24.0	19.4	12.7	-1.3	-23.2

Constitution Street
Assessed receiver spectra in dB(A) - "Scenario 2.sit"

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 39.0 dB(A) LrN 31.9 dB(A)									
LrD	28.1	28.7	26.6	37.3	26.7	22.3	15.6	1.6	-20.3
LrN	25.1	25.7	23.6	24.7	23.7	19.3	12.6	-1.4	-23.3
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.9 dB(A) LrN 51.0 dB(A)									
LrD	37.8	40.8	43.2	56.3	49.8	46.4	40.4	27.9	8.9
LrN	34.8	37.8	40.2	45.0	46.8	43.4	37.4	24.9	5.9
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.4 dB(A) LrN 50.5 dB(A)									
LrD	37.4	40.2	42.4	55.9	49.4	45.6	39.5	27.4	8.5
LrN	34.4	37.2	39.4	44.6	46.4	42.6	36.5	24.4	5.5
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.4 dB(A) LrN 50.5 dB(A)									
LrD	37.4	40.2	42.4	55.8	49.4	45.6	39.6	27.5	8.6
LrN	34.4	37.2	39.4	44.6	46.4	42.6	36.6	24.5	5.6
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.9 dB(A) LrN 51.0 dB(A)									
LrD	37.8	40.8	43.2	56.3	49.8	46.4	40.5	28.0	8.9
LrN	34.8	37.8	40.2	45.0	46.8	43.4	37.5	25.0	5.9
Receiver site 1st floor archway back Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 38.9 dB(A) LrN 32.0 dB(A)									
LrD	27.9	28.5	26.7	37.2	27.2	22.5	15.7	1.7	-20.2
LrN	24.9	25.5	23.7	25.0	24.2	19.5	12.7	-1.3	-23.2
Receiver site 1st floor archway front Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.8 dB(A) LrN 50.9 dB(A)									
LrD	37.7	40.7	43.0	56.2	49.7	46.2	40.3	27.9	8.9
LrN	34.7	37.7	40.0	44.9	46.7	43.2	37.3	24.9	5.9
Receiver south of site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.7 dB(A) LrN 50.8 dB(A)									
LrD	37.4	40.4	42.9	56.1	49.7	46.0	40.3	27.9	8.9
LrN	34.4	37.4	39.9	44.9	46.7	43.0	37.3	24.9	5.9

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
Receiver 94 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 34.1 dB(A) LrN 27.7 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	36.60	-42.3	2.5	-22.7	-0.1		0.0	3.3	-22.5	50.0	0.0	0.0	27.5
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	36.60	-42.3	2.5	-22.7	-0.1		0.0	3.3	-22.5	47.0	0.0	0.0	24.5
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	33.14	-41.4	2.6	-23.0	-0.1		0.0	2.8	-22.2	50.0	0.0	0.0	27.8
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	33.14	-41.4	2.6	-23.0	-0.1		0.0	2.8	-22.2	47.0	0.0	0.0	24.8
Constitution Street	Road	LrD					180.8											0.0					31.5
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 94 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 35.7 dB(A) LrN 28.3 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	36.92	-42.3	2.5	-21.7	-0.1		0.0	3.0	-21.8	50.0	0.0	0.0	28.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	36.92	-42.3	2.5	-21.7	-0.1		0.0	3.0	-21.8	47.0	0.0	0.0	25.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	33.54	-41.5	2.5	-22.2	-0.1		0.0	2.7	-21.7	50.0	0.0	0.0	28.3
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	33.54	-41.5	2.5	-22.2	-0.1		0.0	2.7	-21.7	47.0	0.0	0.0	25.3
Constitution Street	Road	LrD					180.8											0.0					33.7
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 94 constitution street Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 37.9 dB(A) LrN 30.2 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	37.56	-42.5	2.5	-19.7	-0.1		0.0	3.1	-19.8	50.0	0.0	0.0	30.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	37.56	-42.5	2.5	-19.7	-0.1		0.0	3.1	-19.8	47.0	0.0	0.0	27.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	34.32	-41.7	2.5	-20.5	-0.1		0.0	3.0	-19.9	50.0	0.0	0.0	30.1
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	34.32	-41.7	2.5	-20.5	-0.1		0.0	3.0	-19.9	47.0	0.0	0.0	27.1
Constitution Street	Road	LrD					180.8											0.0					36.1
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 100 - west of site courtyard Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 35.7 dB(A) LrN 29.4 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	38.13	-42.6	2.6	-22.3	-0.1		0.0	4.8	-20.8	50.0	0.0	0.0	29.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	38.13	-42.6	2.6	-22.3	-0.1		0.0	4.8	-20.8	47.0	0.0	0.0	26.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	34.64	-41.8	2.7	-22.5	-0.1		0.0	4.4	-20.5	50.0	0.0	0.0	29.5
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	34.64	-41.8	2.7	-22.5	-0.1		0.0	4.4	-20.5	47.0	0.0	0.0	26.5

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
Constitution Street	Road	LrD					180.8											0.0					33.0
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 100 - west of site courtyard Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 37.2 dB(A) LrN 29.8 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	38.49	-42.7	2.6	-21.1	-0.1		0.0	4.2	-20.2	50.0	0.0	0.0	29.8
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	38.49	-42.7	2.6	-21.1	-0.1		0.0	4.2	-20.2	47.0	0.0	0.0	26.8
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	35.07	-41.9	2.7	-21.5	-0.1		0.0	3.8	-20.1	50.0	0.0	0.0	29.9
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	35.07	-41.9	2.7	-21.5	-0.1		0.0	3.8	-20.1	47.0	0.0	0.0	26.9
Constitution Street	Road	LrD					180.8											0.0					35.2
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 100 - west of site courtyard Fl F 2 LrD,lim dB(A) LrN,lim dB(A) LrD 39.7 dB(A) LrN 32.2 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	39.15	-42.8	2.6	-18.5	0.0		0.0	4.2	-17.7	50.0	0.0	0.0	32.3
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	39.15	-42.8	2.6	-18.5	0.0		0.0	4.2	-17.7	47.0	0.0	0.0	29.3
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	35.87	-42.1	2.6	-19.4	-0.1		0.0	4.2	-17.9	50.0	0.0	0.0	32.1
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	35.87	-42.1	2.6	-19.4	-0.1		0.0	4.2	-17.9	47.0	0.0	0.0	29.1
Constitution Street	Road	LrD					180.8											0.0					37.8
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 100 - west of site courtyard Fl F 3 LrD,lim dB(A) LrN,lim dB(A) LrD 43.9 dB(A) LrN 38.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	40.07	-43.0	2.6	-13.5	-0.1		0.0	5.2	-12.0	50.0	0.0	0.0	38.0
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	40.07	-43.0	2.6	-13.5	-0.1		0.0	5.2	-12.0	47.0	0.0	0.0	35.0
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	36.97	-42.3	2.6	-15.1	-0.1		0.0	5.9	-12.1	50.0	0.0	0.0	37.9
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	36.97	-42.3	2.6	-15.1	-0.1		0.0	5.9	-12.1	47.0	0.0	0.0	34.9
Constitution Street	Road	LrD					180.8											0.0					40.8
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 102-104 constitution street Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 36.6 dB(A) LrN 30.9 dB(A)																							

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	37.79	-42.5	2.8	-21.9	-0.1		0.0	5.7	-19.2	50.0	0.0	0.0	30.8
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	37.79	-42.5	2.8	-21.9	-0.1		0.0	5.7	-19.2	47.0	0.0	0.0	27.8
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	34.03	-41.6	2.8	-22.2	-0.1		0.0	5.3	-19.0	50.0	0.0	0.0	31.0
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	34.03	-41.6	2.8	-22.2	-0.1		0.0	5.3	-19.0	47.0	0.0	0.0	28.0
Constitution Street	Road	LrD					180.8											0.0					33.3
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver 102-104 constitution street Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 38.4 dB(A) LrN 32.1 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	38.14	-42.6	2.7	-20.4	-0.1		0.0	5.6	-17.9	50.0	0.0	0.0	32.1
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	38.14	-42.6	2.7	-20.4	-0.1		0.0	5.6	-17.9	47.0	0.0	0.0	29.1
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	34.45	-41.7	2.8	-21.0	-0.1		0.0	5.3	-17.9	50.0	0.0	0.0	32.1
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	34.45	-41.7	2.8	-21.0	-0.1		0.0	5.3	-17.9	47.0	0.0	0.0	29.1
Constitution Street	Road	LrD					180.8											0.0					35.7
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver houses rear Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 36.2 dB(A) LrN 29.7 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	39.43	-42.9	2.7	-21.5	-0.1		0.0	4.4	-20.5	50.0	0.0	0.0	29.5
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	39.43	-42.9	2.7	-21.5	-0.1		0.0	4.4	-20.5	47.0	0.0	0.0	26.5
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	35.82	-42.1	2.8	-21.8	-0.1		0.0	4.1	-20.3	50.0	0.0	0.0	29.7
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	35.82	-42.1	2.8	-21.8	-0.1		0.0	4.1	-20.3	47.0	0.0	0.0	26.7
Constitution Street	Road	LrD					180.8											0.0					33.7
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver houses rear Fl F 1 LrD,lim dB(A) LrN,lim dB(A) LrD 37.9 dB(A) LrN 30.7 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	39.75	-43.0	2.7	-20.0	-0.1		0.0	4.2	-19.3	50.0	0.0	0.0	30.7
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	39.75	-43.0	2.7	-20.0	-0.1		0.0	4.2	-19.3	47.0	0.0	0.0	27.7
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	36.20	-42.2	2.7	-20.6	-0.1		0.0	3.9	-19.3	50.0	0.0	0.0	30.7
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	36.20	-42.2	2.7	-20.6	-0.1		0.0	3.9	-19.3	47.0	0.0	0.0	27.7
Constitution Street	Road	LrD					180.8											0.0					35.8

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver north of site site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.8 dB(A) LrN 51.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.59	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.6	50.0	0.0	0.0	51.6
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.59	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.6	47.0	0.0	0.0	48.6
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	21.96	-37.8	2.8	-3.3	-0.1		0.0	2.0	0.4	50.0	0.0	0.0	50.4
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	21.96	-37.8	2.8	-3.3	-0.1		0.0	2.0	0.4	47.0	0.0	0.0	47.4
Constitution Street	Road	LrD					180.8											0.0					55.5
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 39.0 dB(A) LrN 32.1 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	36.07	-42.1	2.7	-20.1	-0.1		0.0	4.7	-18.0	50.0	0.0	0.0	32.0
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	36.07	-42.1	2.7	-20.1	-0.1		0.0	4.7	-18.0	47.0	0.0	0.0	29.0
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	32.47	-41.2	2.8	-20.6	0.0		0.0	4.3	-18.0	50.0	0.0	0.0	32.0
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	32.47	-41.2	2.8	-20.6	0.0		0.0	4.3	-18.0	47.0	0.0	0.0	29.0
Constitution Street	Road	LrD					180.8											0.0					36.8
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 39.0 dB(A) LrN 31.9 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	36.20	-42.2	2.8	-19.9	0.0		0.0	4.4	-18.1	50.0	0.0	0.0	31.9
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	36.20	-42.2	2.8	-19.9	0.0		0.0	4.4	-18.1	47.0	0.0	0.0	28.9
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	32.55	-41.2	2.8	-20.5	0.0		0.0	4.1	-18.0	50.0	0.0	0.0	32.0
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	32.55	-41.2	2.8	-20.5	0.0		0.0	4.1	-18.0	47.0	0.0	0.0	29.0
Constitution Street	Road	LrD					180.8											0.0					36.8
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.9 dB(A) LrN 51.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.69	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.5	50.0	0.0	0.0	51.5

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.69	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.5	47.0	0.0	0.0	48.5
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	21.99	-37.8	2.9	-3.3	-0.1		0.0	1.9	0.4	50.0	0.0	0.0	50.5
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	21.99	-37.8	2.9	-3.3	-0.1		0.0	1.9	0.4	47.0	0.0	0.0	47.5
Constitution Street	Road	LrD					180.8											0.0					55.6
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.4 dB(A) LrN 50.5 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.91	-39.3	2.9	-0.8	-0.1		0.0	1.7	1.2	50.0	0.0	0.0	51.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.91	-39.3	2.9	-0.8	-0.1		0.0	1.7	1.2	47.0	0.0	0.0	48.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	22.10	-37.9	2.9	-4.4	-0.1		0.0	2.2	-0.4	50.0	0.0	0.0	49.6
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	22.10	-37.9	2.9	-4.4	-0.1		0.0	2.2	-0.4	47.0	0.0	0.0	46.6
Constitution Street	Road	LrD					180.8											0.0					55.2
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.4 dB(A) LrN 50.5 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	26.03	-39.3	2.9	-0.9	-0.1		0.0	1.7	1.1	50.0	0.0	0.0	51.1
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	26.03	-39.3	2.9	-0.9	-0.1		0.0	1.7	1.1	47.0	0.0	0.0	48.1
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	22.17	-37.9	2.9	-4.3	-0.1		0.0	2.2	-0.3	50.0	0.0	0.0	49.7
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	22.17	-37.9	2.9	-4.3	-0.1		0.0	2.2	-0.3	47.0	0.0	0.0	46.7
Constitution Street	Road	LrD					180.8											0.0					55.1
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.9 dB(A) LrN 51.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.64	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.5	50.0	0.0	0.0	51.5
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.64	-39.2	2.8	-0.5	-0.1		0.0	1.7	1.5	47.0	0.0	0.0	48.5
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	21.97	-37.8	2.9	-3.3	-0.1		0.0	2.0	0.5	50.0	0.0	0.0	50.5
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	21.97	-37.8	2.9	-3.3	-0.1		0.0	2.0	0.5	47.0	0.0	0.0	47.5
Constitution Street	Road	LrD					180.8											0.0					55.5
Constitution Street	Road	LrN					180.8											0.0					

Constitution Street
Mean propagation Leq - "Scenario 2.sit"

Source	Source type	Time slice	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	l or A m,m²	KI dB	KT dB	Ko dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Amisc dB	ADI dB	dLrefl dB	Ls dB(A)	dLw dB	Cmet dB	ZR dB	Lr dB(A)
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor archway back Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 38.9 dB(A) LrN 32.0 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	35.95	-42.1	2.7	-20.2	-0.1		0.0	4.8	-18.0	50.0	0.0	0.0	32.0
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	35.95	-42.1	2.7	-20.2	-0.1		0.0	4.8	-18.0	47.0	0.0	0.0	29.0
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	32.41	-41.2	2.8	-20.7	0.0		0.0	4.4	-18.0	50.0	0.0	0.0	32.0
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	32.41	-41.2	2.8	-20.7	0.0		0.0	4.4	-18.0	47.0	0.0	0.0	29.0
Constitution Street	Road	LrD					180.8											0.0					36.7
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver site 1st floor archway front Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.8 dB(A) LrN 50.9 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	25.80	-39.2	2.8	-0.6	-0.1		0.0	1.7	1.4	50.0	0.0	0.0	51.4
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	25.80	-39.2	2.8	-0.6	-0.1		0.0	1.7	1.4	47.0	0.0	0.0	48.4
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	22.04	-37.9	2.9	-3.5	-0.1		0.0	2.0	0.2	50.0	0.0	0.0	50.2
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	22.04	-37.9	2.9	-3.5	-0.1		0.0	2.0	0.2	47.0	0.0	0.0	47.2
Constitution Street	Road	LrD					180.8											0.0					55.5
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																
Receiver south of site 1st floor Fl GF LrD,lim dB(A) LrN,lim dB(A) LrD 57.7 dB(A) LrN 50.8 dB(A)																							
tram North to South	Line	LrD			14.3	36.8	180.2	0.0	0.0	0	26.42	-39.4	2.9	-0.7	-0.1		0.0	1.7	1.2	50.0	0.0	0.0	51.2
tram North to South	Line	LrN			14.3	36.8	180.2	0.0	0.0	0	26.42	-39.4	2.9	-0.7	-0.1		0.0	1.7	1.2	47.0	0.0	0.0	48.2
tram South to North	Line	LrD			14.3	36.8	180.9	0.0	0.0	0	22.29	-38.0	2.9	-3.1	-0.1		0.0	1.8	0.4	50.0	0.0	0.0	50.4
tram South to North	Line	LrN			14.3	36.8	180.9	0.0	0.0	0	22.29	-38.0	2.9	-3.1	-0.1		0.0	1.8	0.4	47.0	0.0	0.0	47.4
Constitution Street	Road	LrD					180.8											0.0					55.4
Constitution Street	Road	LrN					180.8											0.0					
Constitution Street	Road	LrD					181.5																
Constitution Street	Road	LrN					181.5																

Constitution Street
Octave spectra of the sources in dB(A) - "Scenario 2.sit"

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
tram North to South	Line	180.16			14.3	36.8	0.0	0.0		0	trams	trams	23.4	25.7	26.6	30.8	32.3	28.4	22.5	11.2	-5.2
tram South to North	Line	180.95			14.3	36.8	0.0	0.0		0	trams	trams	23.5	25.7	26.6	30.8	32.3	28.4	22.5	11.2	-5.2

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03 August 2021

Applicant Response

104 Constitution Street, Leith

Reference: 20/05447/FUL

Summary

It is considered that Environmental Protection ('EP') has raised no substantive evidence in its response to the Local Review Body ('LRB') to justify refusal of the planning application. The matters set out in the Applicants original Local Review Statement, with the associated documents, remain valid and demonstrate that the development is in accordance with Policy Hou 5 of the LDP. Inaudibility is not the relevant test when determining if a satisfactory residential environment can be provided; however, closed window attenuation for a single window and floor insulation are proposed.

The Applicant has undertaken extensive engagement with EP to develop the proposals in relation to noise impact and there are long lines of communication showing this cooperation. The EP guidance has been followed and a floating floor is now proposed in line with its latest comments. It should be noted that the changes made in this revised Noise Impact Assessment and floor build up detail are minor when compared to those initially submitted to and accepted by the LRB; however, they do provide a robust floating floor which was suggested by EP as satisfying their requirements. These mitigation measures are appropriate and can be formally agreed and secured via the following condition (which meets the six planning condition tests) on the planning permission:

The apartment hereby approved shall not be occupied as a residential dwelling unless the window (highlighted on plan reference 251-MICA-PL-00-DR-A-19220, mark up date 26/04/2021, revision PL2) is permanently sealed shut; and the floor (highlighted on plan reference 251-MICA-PL-00-DR-A-19200, mark up date 26/04/2021, revision PL2) is attenuated in accordance with details to be submitted to and approved by the local planning authority.

This approach has been accepted by CEC for much larger residential applications elsewhere in Edinburgh (i.e., application 19/02664/AMC for 151 flats in total – closed window attenuation with trickle ventilation with windows openable for rapid ventilation, was accepted on the northern and east / west elevations of all four apartment blocks to all habitable room windows on all floors of the development).

Section 14 of the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 states that, in considering whether to grant planning permission for development which affects a listed building or its setting, special regard should be had to the desirability of preserving the building or its setting or any features of special architectural or historic interest. No features of special architectural or historic interest which the existing building possesses will be impacted by the proposals and as such planning permission should be granted; and listed building consent is not required. Should listed building consent be required in future, this is a separate process, and the legislation does not prevent planning applications being granted independently of listed building consent. Numerous applications are determined in this manner. The proposals comply with the development plan and all material considerations and accordingly the LRB is requested to grant planning permission for the proposed development.

Introduction

1. This 'Applicant Response' is submitted to address matters raised by City of Edinburgh Council ('CEC') Environmental Protection in their further comments on planning application reference 20/05447/FUL ('the application').

2. The application was continued by the Local Review Body ('LRB') on 23 June 2021 to allow CEC Environmental Protection ('EP') the opportunity to comment on the additional information submitted by the Applicant regarding their Noise Impact Assessment; specifically, the proposed floor insultation and the proposed fixed window. The LRB also sought clarification as to how a NIA can be carried out during the current Covid-19 restrictions if premises are closed.

3. CEC Environmental Protection then provided its comments on 20 July 2021. The comments made below are on behalf of the Applicant team ('the Applicant') in response to the points raised by CEC and expand upon, but do not repeat, the matters raised in the Local Review Statement and supporting documents.

Point 1 – Fixed Window (Enforceability)

4. The Applicant Team have confirmed to EP that indefinitely fixing the window closed will ensure that plant noise will be within the noise limits specified by Environmental Protection (i.e., below NR25 internally).

5. EP have stated in its response however that it is concerned that a fixed window may be openable and if a noise complaint was received, an investigation would be instigated by EP if a statutory noise nuisance exists.

6. In the determination of this review, it must be taken into consideration that the *planning* issue is whether satisfactory residential amenity can be provided and not whether a statutory noise nuisance exists or whether building regulations are met – those latter points are separate issues.

7. Satisfactory residential amenity refers to the entire environment of the property – noise is one consideration but that has to be balanced alongside others – for example, proximity to local services, facilities and transportation being another. As amenity can be defined by many different issues, future residents may be prepared to accept some noise infiltration from outside premises to have the benefit of living in close proximity to shops, facilities and transport links. It is not necessary, therefore, to expect all residential properties to be protected wholly from noise (i.e., inaudible noise penetration). Such decision making would mean that all existing apartments above commercial properties present unacceptable living conditions and would result in a presumption against residential properties in central areas. This is not tenable in Edinburgh.

8. The EP response states that its investigation of statutory noise nuisance (which as stated exceeds the level of amenity in relation to planning issues) would involve: *'the taking of a noise measurement from within the application property and if the window is openable, the assessment is likely to be undertaken with the window slightly open for ventilation purposes.'*

9. The EP response goes on to state that: *'if the internal noise levels are found to be above NR25 then enforcement action would be taken against the operator of the restaurant below who would be required to take action to reduce the noise levels (even with the planning condition in place).'*

10. The EP response goes on to state that: *'it is likely though that discussions would be undertaken with the Planning Enforcement team to decide if the window should be fixed closed once again. This would be a decision for the Planning Enforcement team to take'.* EP is concerned that although the window can be conditioned to be fixed closed, in the future this: *'may be unlikely to be deemed a condition which will continue to meet the 6 planning tests and no longer be deemed enforceable by Planning. In this regard, Environmental Protection recommends that clarification on the enforceability of such a condition be requested from the Planning Enforcement team.'*

11. Notwithstanding the fact that the Applicant team considers that it is inappropriate to determine the application now on decisions which may be made in the future, it is clear that closed window attenuation is a commonly used method of mitigation against external noise in residential properties. For example, application reference 19/02664/AMC for the 'Approval of Matters Specified in Conditions 1 and 17 of 16/03356/PPP for Phase 6 and 7 of the approved masterplan', at Former 9 - 21 Salamander Place, Edinburgh. This application comprised four apartment blocks consisting of 151 flats in total. Closed window attenuation with trickle ventilation (windows openable for rapid ventilation), was accepted on the northern and east / west elevations of all four apartment blocks to all habitable room windows (bedrooms and living rooms) on all floors of the development, as demonstrated on the plan below (yellow line indicating closed windows).

12. This mitigation was required due to the existing industrial and commercial noise sources to the immediate north of that site at Former 9 – 21 Salamander Place, and has been granted consent by CEC. A consistent approach is requested.

Figure 1 - 19/02664/AMC Noise Mitigation (closed windows on yellow elevations).

13. It is considered that the proposed development at 104 Constitution Street should therefore be considered acceptable, being of much more modest scale, with only one window being required to be sealed shut to protect residential amenity, to statutory noise nuisance level, and the operation of nearby uses.

14. In addition, closed window attenuation is accepted as per Planning Advice Note 1/2011 (Planning and Noise), which stipulates at Paragraph 16 that, although preferable for a satisfactory noise environment to be provided with open windows, *'local circumstances, particularly relating to the existing noise character of the area, should influence the approach taken to noise levels with open or closed windows. It may be appropriate to take a different approach to noise levels in different areas.'*

15. Paragraph 16 of Planning Advice Note 1/2011 (Planning and Noise) goes on to state that: *'in some circumstances however, closed windows with alternative means of ventilation may be unavoidable.'* This is a reasonable approach as each case is different, and to ensure that a mix of residential types and locations are provided within the City to suit to wide-ranging requirements and choices for its resident population.

16. As such, if the LRB considers it essential, then a condition that requires this particular window to be indefinitely closed in order to provide a satisfactory residential environment which is compatible with neighbouring uses, will meet the six planning condition tests as set out in Planning Circular 4/1998 (The Use of Conditions in Planning Permissions) as follows:

    - **Necessary** – to protect the amenity of future occupants and the operation of nearby uses.
    - **Relevant to planning** – to meet the requirements of LDP Policy Hou 5 in terms of compatibility with nearby uses and providing a satisfactory residential environment.
    - **Relevant to the development to be permitted** – conversion from office to residential in an urban area, where the surroundings are characterised by ground floor commercial and upper floor residential uses.
    - **Enforceable** – if the window is opened, the Applicant or future occupant will be in breach of this condition and enforcement can request the window is closed.
    - **Precise** – the condition relates specifically to the window in question, as clearly identified on the submitted plans.
    - **Reasonable in all other respects** – to allow the change of use from office to residential at this site which the Applicant has purchased, being in keeping with the surrounding character.

17. In light of the above, it is considered that the use of a condition requiring the particular window to be sealed shut is acceptable, enforceable and meets the six tests provided by Planning Circular 4/1998.

Point 1 – Fixed Window (Building Regulations)

18. The EP response also raises concern that in the future, justification to keep the window openable may stem from future Building Regulation requirements (from a safety perspective) e.g., to allow the window to be safely cleaned or as additional means of fire escape.

19. It can be confirmed that the closed window will accord with current Building Regulations.

20. The EP response goes on to state that: '*should in the future, the condition to fix the window indefinitely closed not be deemed to meet the 6 planning tests (e.g., because of such Building Control regulation changes) and therefore be deemed unenforceable in planning terms, then any noise will be considered under statutory nuisance legislation and the owner of the restaurant below would ultimately be responsible for ensuring the noise issue is addressed.*'

21. The Applicant considers this point to be unreasonable, as although Building Regulations may change in future, details of these changes are not available at this time and it is not considered that future changes to Building Regulations should prevent the change of use at this site, which is under the ownership of the Applicant who intends to make this unit their home and artist studio. Planning decisions have to be based upon the information, policies and advice available at the time of determination and not on unknown changes which *may* take place in the future. Indeed, the restaurant *may* close, and the unit *may* be changed, under permitted development rights, to a Class 1 or 2 use or alternative use through the grant of planning permission. To refuse this application on the grounds of undefined future changes is not reasonable when to refuse this permission would mean that the unit would remain vacant indefinitely, affecting both housing provision and the vitality of the area.

22. The Applicant purchased the site in December 2020 and has since been living in rented accommodation with their family, awaiting the determination of this application. As such, the change of use of the unit, including the required window sealing, will be implemented immediately. A pre-occupation condition secures this by requiring the specified window to be closed prior to occupation of the unit.

Point 2 – Additional Floor Insulation

23. In line with the comments received from EP, the Applicant has prepared a revised Noise Impact Assessment which demonstrates that the inaudibility requirements of EP will be met by means of floor insulation.

24. Notwithstanding this, the issues addressed above still apply. Although inaudibility is not the required test, if EP still require, a condition can be applied to the planning permission which requires the approval and implementation of the closed window attenuation and floor insulation measures prior to the occupation of the unit. The suggested wording for this condition is as follows:

    '*The apartment hereby approved shall not be occupied as a residential dwelling unless the window (highlighted on plan reference 251-MICA-PL-00-DR-A-19220, mark up date 26/04/2021, revision PL2) is permanently sealed shut; and the floor (highlighted on plan reference 251-MICA-PL-00-DR-A-19200, mark up date 26/04/2021, revision PL2) is attenuated in accordance with details to be submitted to and approved by the local planning authority.*'

25. This will allow the specific floor attenuation measures to be agreed and the condition discharged prior to occupation of the dwelling. The proposed condition will meet the six planning condition tests as set out in Planning Circular 4/1998 (The Use of Conditions in Planning Permissions) as follows:

    - **Necessary** – to protect the amenity of future occupants and the operation of nearby uses.
    - **Relevant to planning** – to meet the requirements of LDP Policy Hou 5 in terms of compatibility with nearby uses and providing a satisfactory residential environment.

- **Relevant to the development to be permitted** – conversion from office to residential in an urban area, where the surroundings are characterised by ground floor commercial and upper floor residential uses.
- **Enforceable** – if the window is opened or floor attenuation not implemented, the Applicant or future occupant will be in breach of this condition and enforcement can request the window is closed and floor attenuation is implemented.
- **Precise** – the condition relates specifically to the window and floor in question, as clearly identified on the submitted plans.
- **Reasonable in all other respects** – to allow the change of use from office to residential at this site which the Applicant has purchased, being in keeping with the surrounding character.

26. It is considered that the proposed condition is acceptable, enforceable and meets the six tests provided by Planning Circular 4/1998.

Point 3 – Undertaking a NIA During Period of Covid-19 Restrictions

27. The Applicant welcomes the comments from EP accepting the methodology of the NIA and reiterating that appropriate assessments can be undertaken given the Covid-19 restrictions.

[redacted]

From: Colin Brown <Colin.Brown2@edinburgh.gov.uk>
Sent: 20 July 2021 14:29
To: Gina Bellhouse <Gina.Bellhouse@edinburgh.gov.uk>
Subject: FW: 20/05447/FUL 104 Constitution Street, LRB Information Request

FAO Gina Bellhouse,

Further to your request for additional information from Environmental Protection relating to the above application I would confirm the following:

1. Fixed Window.

   The applicant's acoustic consultant has confirmed to Environmental Protection that indefinitely fixing the window closed will ensure that plant noise will be within the noise limits required by Environmental Protection (i.e. below NR25 internally).

   Environmental Protection is however concerned that a fixed window may be utilised to address noise concerns at this planning stage but that future owners of the application property may decide to make the window openable again at a later date. If a complaint of plant noise is then received by the Council from the occupants of the application property, an investigation would be instigated by this team to assess whether a statutory noise nuisance exists. In order to assess this, a noise measurement would be taken from within the application property and if the window is openable, the assessment is likely to be undertaken with the window slightly open for ventilation purposes. If the internal noise levels are found to be above NR25 then enforcement action would be taken against the operator of the restaurant below who would be required to take action to reduce the noise levels (even with the planning condition in place). It is likely though that discussions would be undertaken with the Planning Enforcement team to decide if the window should be fixed closed once again. This would be a decision for the Planning Enforcement team to take. Environmental Protection is concerned that although the window can be conditioned to be fixed closed, in the future this may be unlikely to be deemed a condition which will continue to meet the 6 planning tests and no longer be deemed enforceable by Planning. In this regard, Environmental Protection recommends that clarification on the enforceability of such a condition be requested from the Planning Enforcement team. It is also a concern that in the future, justification to keep the window openable may stem from future Building Regulation requirements (from a safety perspective) e.g. to allow the window to be safely cleaned or as additional means of

fire escape. Should in the future, the condition to fix the window indefinitely closed not be deemed to meet the 6 planning tests (e.g. because of such Building Control regulation changes) and therefore be deemed unenforceable in planning terms then any noise will be considered under statutory nuisance legislation and the owner of the restaurant below would ultimately be responsible for ensuring the noise issue is addressed.

2. Additional Floor Insulation.

Noise from the ground floor commercial properties was highlighted by Environmental Protection as an issue of concern and likely to affect the residential amenity of the application property if not addressed. In this regard, the applicant has submitted additional floor insulation details to address the concerns raised.

The applicant's acoustic consultant has confirmed that the performance of the existing separating floor was determined using measurements conducted simultaneously in the ground floor restaurant and the proposed apartment at first floor. This identified significant weakness in the separating floor/ceiling at frequencies between 63 and 250Hz. The proposed floor upgrade to the apartment will extend across the entire residential area (above both the retail and restaurant premises). This includes the proposal to double the notional density of the floor from ~90 to 180 kg/m^2, including dense granular material, mineral wool, plywood and plasterboard. The detailed specification for the upgraded floor is set out in the architect's drawing in Appendix 1 of the acoustic consultant's letter report dated 26th April 2021. Further discussions have occurred between the applicant's acoustic consultant and Environmental Protection. Ultimately, the acoustic consultant is unable to confirm or demonstrate that the operations within the restaurant would meet the requirements of this team when the additional sound insulation is installed (i.e. inaudibility from normal restaurant operations within the application property).

At the time of the assessment the retail premises was closed and therefore the applicant's acoustic consultant utilised measurements taken on a previous occasion from within a takeaway premises to represent similar noise levels that could be found within the ground floor retail premises. Whilst not exactly replicating retail noise source operations, such a multi-frequency noise source could be considered representative of likely noise events from within a retail premises if appropriate operations were being undertaken whilst noise measurements are taken (clarification of such details have yet to be provided). However assuming the source noise is deemed to be appropriate, the applicant's acoustic consultant has advised that calculations have demonstrated that installing the proposed upgraded floor insulation should ensure that normal retail operations are inaudible within the application property above and should meet the requirements of Environmental Protection.

A further option of a floating floor was submitted by the acoustic consultant on 14 July 2021 which may address the noise issues of concern however further information and discussions are required in this regard before Environmental Protection is in a position to advise if this latest option will suffice.

3. Undertaking a Noise Impact Assessment During the Period of Covid Restrictions.

Environmental Protection requested a noise impact assessment which demonstrated that noise from normal operations (retail and restaurant below) would be inaudible within the application property above. The noise impact assessment confirmed that normal noise levels/operations from below would be audible within the upstairs application property. The report then recommended

mitigation (e.g. by way of additional floor insulation) which was anticipated would address noise concerns likely to affect the application property.

With regards to the restaurant below, the applicant confirmed that they managed to replicate the operations of a restaurant (within the restaurant below) with the assistance of the downstairs restaurant proprietor. In this regard, it is understood that kitchen noise was replicated (including banging and clattering of pans), normal kitchen equipment operated, music played and conversation was undertaken within the restaurant with the noise levels measured. Calculations were then undertaken to assess the existing level of sound insulation separating the upstairs and downstairs properties. Once calculations confirmed that the existing floor was found to be unable to contain normal noise levels from the downstairs commercial premises, additional floor insulation was then recommended as a method of mitigation.

The retail premises situated below the application property was closed during the period of assessment and so representative in-situ noise levels could not be measured. Whilst there can be difficulties undertaking a noise impact assessment when there are no actual operations occurring within the commercial premises below, other methods can be utilised to replicate in-situ noise events. Normally this would require the use of suitable source noise frequency levels which are representative of the normal operations of the premises below with noise calculations then undertaken which also consider the existing floor insulation levels to assess if the noise levels from the premises below will meet the criteria of this team. The applicant's acoustic consultant therefore provided an assessment which utilised source noise levels which they advise are likely to replicate retail operations. In this regard, previously measured takeaway premises' operations were used as source noise levels. The noise impact assessment also assumed that the existing retail separating floor insulation levels would be the same as those found to be separating the application premises from the restaurant (which is likely and therefore a fair assumption to make). The assessment calculations confirmed that additional attenuation in the form of dense separating flooring insulation within the application premises would be required to ensure that noise from the retail premises would meet Environmental Protection's required inaudibility criteria.

Noise impact assessments can be undertaken in a number of different ways and should be scoped, tailored and carried out to suit the circumstances of the project (including being in the midst of a pandemic). In general terms, the methods used in the noise impact assessment, with the circumstances encountered by the applicant/acoustic consultant, were deemed acceptable to Environmental Protection.

I trust the above provides the LRB with the additional information they require however please do not hesitate to contact me for any further information in this regard.

Regards
Colin Brown

Colin Brown | Environmental Health Officer | Environmental Protection | Regulatory Services | Directorate of Place | City of Edinburgh Council | Waverley Court, 4 East Market Street, Edinburgh, EH8 8BG | colin.brown2@edinburgh.gov.uk | 0131 469 5802 |

Hi Environmental Protection,

The above application was continued by the Local Review Body on 23 June 2021 to allow Environmental Protection the opportunity to comment on the additional information submitted by the applicant regarding their NIA; specifically the proposed increased insultation and the proposed fixed window to the rear. The Panel also sort clarification as to how a NIA can be carried out during the current COVID restrictions if premises are closed.

I have attached the Local Review documentation for your information. I would be grateful if you could review the information and provide a response as the acceptability of the proposals.

I would be grateful if you could provide a response by 14 July.

Many thanks,
Gina

Gina Bellhouse |Team Manager | Service Development and Appeals | Planning and Building Standards | Place Directorate | The City of Edinburgh Council | Waverley Court | Level G:3 | 4 East Market Street | Edinburgh | EH8 8BG | (Mon to Thurs) | gina.bellhouse@edinburgh.gov.uk | www.edinburgh.gov.uk Latest Planning updates http://twitter.com/planningedin and http://planningedinburgh.com/

Our office is still closed and we are working from our homes using email and other online communications.

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