

ACOUSTIC DESIGN STATEMENT

FOR

**Kelland Homes Limited
Russell Square Centre,
Unit 5 Fortunestown Way,
Tallaght Dublin 24
Preparation**

RELATING TO A PROPOSED

RESIDENTIAL DEVELOPMENT

AT

CAPPAGH, CLONBURRIS SDZ

16th November 2022



Prepared By: Ian Byrne MSc MIOA, MSc Environmental & Planning Law

1.0 INTRODUCTION

This Acoustic Design Statement (ADS) has been prepared on behalf of Kelland Homes Limited and presents an assessment of the inward noise impact of rail traffic noise on the proposed Clonburris SDZ development site in the townland of Cappagh and has been completed in compliance with a request for Additional Information from South Dublin County Council as follows:

The applicant is requested to submit a noise impact assessment, carried out by appropriately qualified acoustician and competent persons, must be submitted in order to assess the potential impact of environmental noise from the railway line. The proposed noise assessment must assess if noise from the nearby train line will impact on the proposed development. Where deemed necessary a statement outlining recommended acoustic control measures that should be incorporated into the design and construction of the proposed residential units and/or site to ensure against adverse noise impacts on the occupiers must be included. South Dublin County Council Environmental Noise Action Plan 2018 – 2023 recommends that the noise impact assessment should demonstrate that all facets of the UK 'Professional Practice Guidance on Planning & Noise' (2017) (ProPG) have been followed.

2.0 EXPERIENCE OF IAN BYRNE MIOA (MEMBER OF THE INSTITUTE OF ACOUSTICS)

The noise surveys and the preparation of this Acoustic Design Statement were conducted by Ian Byrne, Principal Acoustic Consultant of Byrne Environmental Consulting Ltd who is Member of the Institute of Acoustics (MIOA) (Ref. Appendix I) and meets the criteria for a “competent person” as defined by the EPA in their 2016 EPA publication, “Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)”.

Ian Byrne has over 25 years extensive experience in the monitoring, assessment and management of noise and vibration associated with transport, construction, commercial and industrial related sources and the provision of specialist acoustic consultancy services relating to building design.

A key relevant aspect of his experience is the completion of transport related (Road, Airport Flight-Path, Mainline Rail and LUAS Light Rail) noise impact assessments for new residential developments to evaluate compliance with Local Authority Noise Action Plans and the subsequent provision of acoustic design statements including mitigation measures to reduce the impact to acceptable levels within buildings with regard to ProPG.

3.0 SITE LOCATION AND CONTEXT

The proposed development is located west of the Ninth Lock Road, south of the Dublin-Cork railway line, north of Cappaghmore housing estate and Whitton Avenue, and east of an existing carpark / park & ride facility at the Clondalkin Fonthill train station and the R113 (Fonthill Road). The proposed development is located within the Clonburris Strategic Development Zone (SDZ), within the development areas of (i) Clonburris South East (i.e. CSE-S1 & CSE-S2) and (ii) part of Clonburris Urban Centre (i.e. CUC-S4), as identified in the Clonburris SDZ Planning Scheme 2019.

The Dublin-Cork Rail Line is the principal existing ambient noise source that impact the subject site.

Rail traffic noise associated with the Dublin Cork Rail Line which runs along the northern site boundary has been assessed by completing on-site noise measurements and by reviewing the EPA's Round 3 Rail Noise Mapping of this rail line. Rail noise dominates the northern site boundary during the daytime and night time periods albeit on a non-continuous basis.

Figure 1 SDZ Development Site Location Map



4.0 ACOUSTIC DESIGN GUIDANCE

4.1 DUBLIN AGGLOMERATION NOISE ACTION PLAN 2018 - 2023 (DNAP)

The Dublin Agglomeration Noise Action Plan 2018 - 2023 (DNAP) has been prepared in accordance with the requirements of the *European Communities Environmental Noise Regulations 2018, S.I. No. 549 / 2018*. These Regulations give effect to the *EU Directive 2002/49/EC* relating to the assessment and management of environmental noise.

The objectives of the Noise Action Plan are to avoid, prevent and reduce on a prioritised basis, where necessary, the harmful effects due to long term exposure to environmental noise. This can be achieved by taking a strategic approach to managing environmental noise and following a balanced approach in the context of sustainable development.

Section 7.10.1.2 of the DNAP states:

"When new developments are being constructed it is important that both houses and apartments are designed, orientated and located in such a way so as to limit the impacts of noise from traffic. All new applications for residential developments will be assessed and where there is the likelihood of an adverse noise impact the applicant will be required to produce a noise impact assessment carried out by appropriately qualified acousticians and competent persons. The noise impact assessment should demonstrate that all facets of the UK "Professional Practice Guidance on Planning & Noise" (2017) (ProPG) have been followed".

4.2 PROFESSIONAL GUIDANCE ON PLANNING & NOISE (PROPG)

The *Professional Guidance on Planning & Noise (ProPG)*, May 2017 was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH) has been generally considered as a best practice guidance and has been widely adopted by Local Authorities in Ireland to risk assess the noise impact on a residential development.

The ProPG document is used in this ADS to evaluate the extent of the noise impact that existing rail traffic have on the subject development site.

The ProPG outlines a systematic risk based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,

Stage 2 – Involves a full detailed appraisal of the proposed development covering four “key elements” that include:

- Element 1 - Good Acoustic Design Process;
- Element 2 - Noise Level Guidelines;
- Element 3 - External Amenity Area Noise Assessment
- Element 4 - Other Relevant Issues

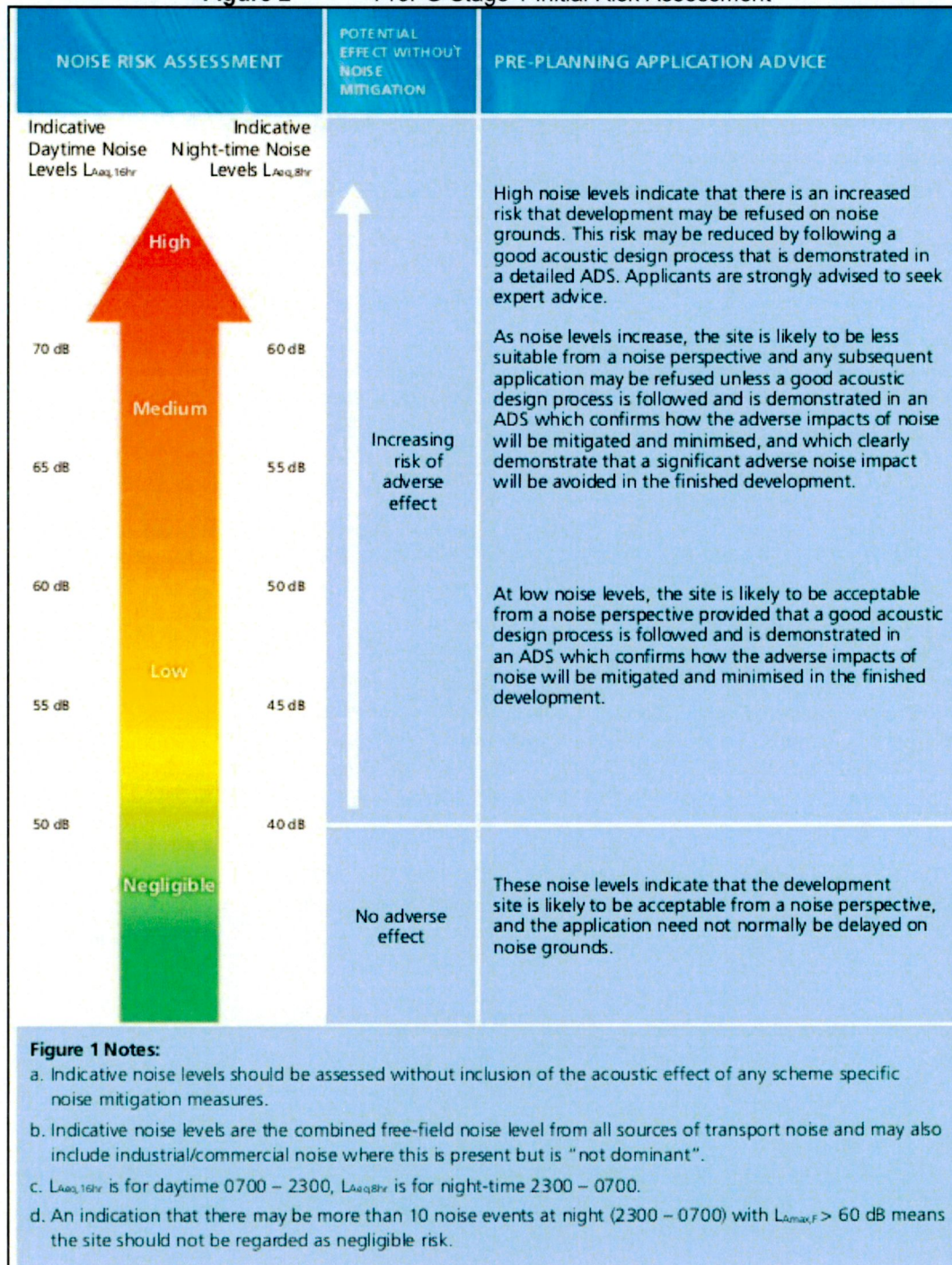
The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 2 presents the basis of the initial noise risk assessment and provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

Element 2 of the ProPG document sets out recommended internal noise targets derived from *BS 8233: 2014: Guidance on Sound Insulation and Noise Reduction for Buildings*. The recommended indoor ambient noise levels are detailed in Table 1.

Table 1 ProPG Recommended Internal Noise Levels

Activity	Location	Period (07:00 to 23:00hrs)	Period (23:00 to 07:00hrs)
Resting	Living Room	35 dB LAeq, 16hr	NA
Dining	Dining Room/Area	40 dB LAeq, 16hr	NA
Sleeping (Daytime Resting)	Bedroom	35 dB LAeq, 16hr	30 dB LAeq, 8hr 45 dB LAfmax
External Amenity	Garden	50-55 dB LAeq, 16hr	NA

Figure 2 ProPG Stage 1 Initial Risk Assessment



5.0 BASELINE NOISE MEASUREMENT METHODOLOGY

The methodology used to measure and assess the existing on-site ambient noise climate and to determine the impact that existing rail related noise has on the subject site was conducted in accordance with *ISO 1996-1 2017 Acoustics – Description, Measurement and Assessment of Environmental Noise Part 1*.

5.1 Noise Measurement Instrumentation

Noise measurements were made using a calibrated *Bruel and Kjaer 2250 integrating sound level meter*. The sound level meter is Class 1 instruments which is in accordance with IEC 61672-1:2013 regulations. The sound level meter used for the surveys was fitted with *B&K UA1401* outdoor monitoring windshields. Appendix II details the Calibration Certificate of the *B&K 2250* Sound Level Meter used for the survey.

5.2 Noise Measurement Location

Free-field noise measurements at a height of c. 6m (to represent 1st floor bedroom level) were conducted at location N1 opposite Dublin-Cork Rail Line at the closest building façade footprint facing towards the rail line at a distance of c. 35m from the closest rail track as indicated as N1 in Figure 3 below.

5.3 Existing Ambient Noise Sources

Passing train movements on the Dublin-Cork Rail Line dominate the existing ambient noise climate at the subject development site. Road traffic on the Fonthill Road is audible in the distance. There are no industrial or commercial noise sources observable at the subject site.

5.4 Vibration Survey

In order to evaluate the potential vibrational impact that passing trains may have at the development, a 24-hour vibration survey was conducted at location N1 on 19.10.22.. Vibration monitoring was conducted in accordance with *BS 7385 Evaluation and measurement for vibration in buildings: Part 1 1990 Guide for measurement of vibrations and evaluation of their effect on buildings* and *BS 7385 Evaluation and measurement for vibration in buildings: Part 2 1993 Guide to damage levels arising from ground borne vibration*. Table 2

Table 2 BS 7385 Transient vibration guide values for cosmetic damage

Type of building	PPV (mm/s) in frequency range of predominant pulse	
	4-15Hz	15Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings.	50mm/s at 4Hz and above.	50mm/s at 4Hz and above.
Unreinforced or light framed structures. Residential or light commercial buildings.	15mm/s at 4Hz increasing to 20mm/s at 15Hz.	20mm/s at 15Hz increasing to 50mm/s at 40Hz and above.

Table 3 outlines the vibration levels (in terms of PPV) their likely effect on humans.

Table 3 BS5228 Guidance on the effect of construction vibration levels on humans

Vibration Level (PPV)	Effect
0.14mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.30mm/s	Vibration might be just perceptible in residential environments.
1.0mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

5.5 Results of Vibration Survey

The highest measured vibration level at the closest building façade to the rail track was 0.06mm/sec PPV.

The recorded levels are below the human perceptible range.

The recorded levels are below the threshold for causing potential cosmetic or structural damage to the property.

Figure 3 Baseline Noise Monitoring Location N1



6.0 BASELINE NOISE SURVEY RESULTS

Baseline noise levels were measured on 19th October 2022 during appropriate meteorological conditions. Windspeed <5m/sec, Dry, Mild. All commuter and intercity rail services as well as freight train movements were operating normally during the 24-hour survey as confirmed by Iarnrod Eireann.

Table 4 presents the measured noise levels as LAeq, 16-hour and LAeq, 8-hour values.

Table 4 Location N1 Northern Site Boundary opposite Dublin-Cork Rail Line

Parameter	Measured sound pressure levels dBA (re 20µPa)	
	Daytime LAeq, 16hr	Nighttime LAeq, 8hr
Measured Value	60	50
ProPG Risk Assessment	Low	Low

7.0 DISCUSSION OF RECORDED NOISE LEVELS

The recorded Daytime LAeq, 16hr and Night time LAeq, 8hr values at the footprint of the closest residential dwelling to the rail line were 60 and 50 dB(A) respectively which are in the Low risk range of the ProPG Assessment.

The highest recorded night time LAFmax value was 82dB(A) and LAFmax values over 80 dB(A) occurred on more than 10 occasions during the night time period.

The ProPG Noise Risk Assessment states that for low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an Acoustic Design Statement which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

8.0 NOISE MITIGATION BY DESIGN

The inward noise impact from rail noise on the northern most facades of the dwellings will be mitigated by design to ensure that the internal noise climate within the development will achieve the recommended *ProPG* internal noise levels (*BS 8233: 2014: Guidance on Sound Insulation and Noise Reduction for Buildings*) as detailed above in Table 1. Table 5 below details the sound insulation required for glazing to ensure that the internal noise levels do not exceed the limit criteria as specified in *BS 8233:2014*.

Table 5 Assessment of Sound Insulation Requirements

Assessment Location	Daytime $L_{Aeq, 16hr}$	Night time $L_{Aeq, 8hr}$	Required Façade Attenuation Rw dB	Predicted Internal Noise Level (Daytime Limit 35dB $L_{Aeq, 16hr}$)	Predicted Internal Noise Level (Night time Limit 30dB $L_{Aeq, 8hr}$)
Facades facing rail line	60	50	25	35	25
	Night time L_{AFmax}		Minimum Façade Attenuation Rw dB	Predicted Internal Noise Level Limit 45db L_{AFmax}	
	82 L_{AFmax}		37	45 L_{AFmax}	

The measured L_{AFmax} values during the night time period dictate a minimum sound insulation rating (Rw) of 37dB(A) for glazing on properties fronting towards the rail line.

Glazing

The northern façades of the apartments and houses facing towards the rail track shall include acoustically rated glazing with a minimum Rw value of 37dB as indicated in Table 5 above to ensure that the internal environment of the building achieve the *BS 8233:2014* internal acoustic design criteria as detailed in Table 1 above. Figure 4 shows the units that shall have acoustically rated windows.

Ventilation

The habitable rooms of houses (Ref Fig 4 below) facing towards the rail line shall have acoustically rated wall vents with an acoustic performance of at least 50dB Dn,e,w (C:Ctr).

The apartment units shall be centrally mechanically ventilated and will not contain passive wall vents.

Figure 4 Site Plan showing units requiring acoustic glazing



9.0 CONCLUSIONS

A comprehensive assessment of the inward noise impact that rail noise will have on the proposed development has been conducted with regard to the *Professional Guidance on Planning & Noise (ProPG), 2017*.

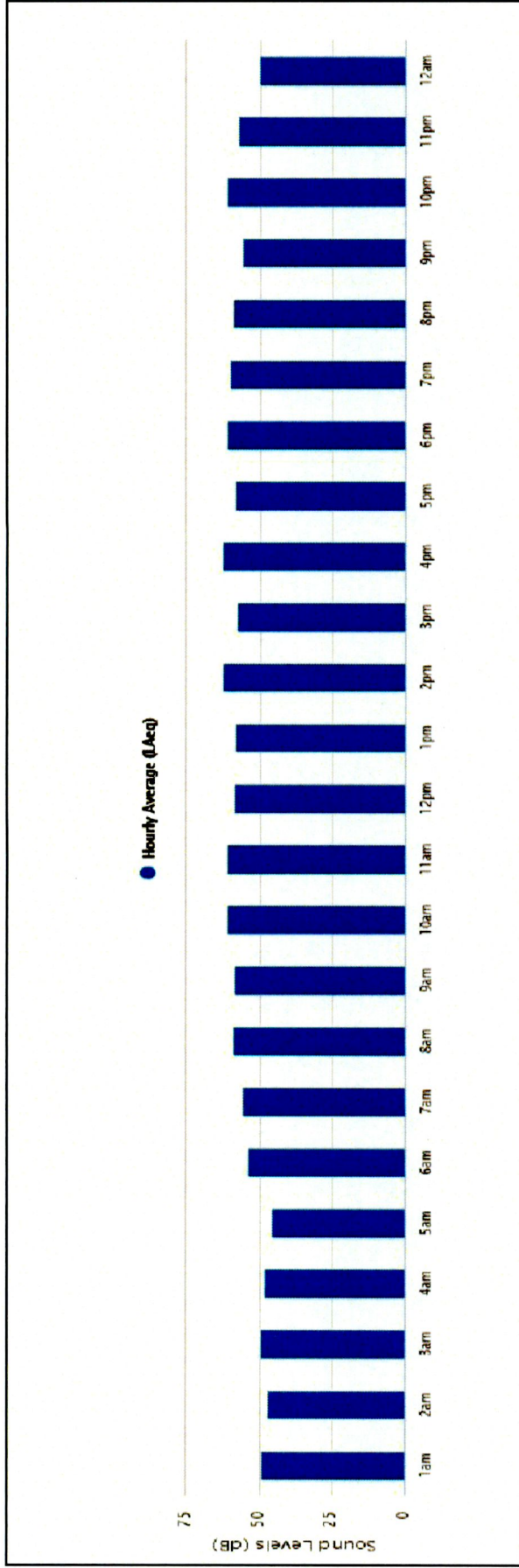
Existing daytime and nighttime noise levels have been established by conducting noise measurements on-site at the proposed closest façade of properties to the Dublin-Cork Rail Line located to the north of the site.

The measured rail noise levels when assessed in accordance with the *Professional Guidance on Planning & Noise (ProPG)*, indicate that the daytime and night time noise levels are within the Low risk category.

In order mitigate the inward noise impact and achieve the internal acoustic design criteria specified in *BS 8233:2014*, specific mitigation measures including acoustically rated windows and wall vents shall be integrated into the design of all identified units facades fronting towards the Dublin-Cork rail line..

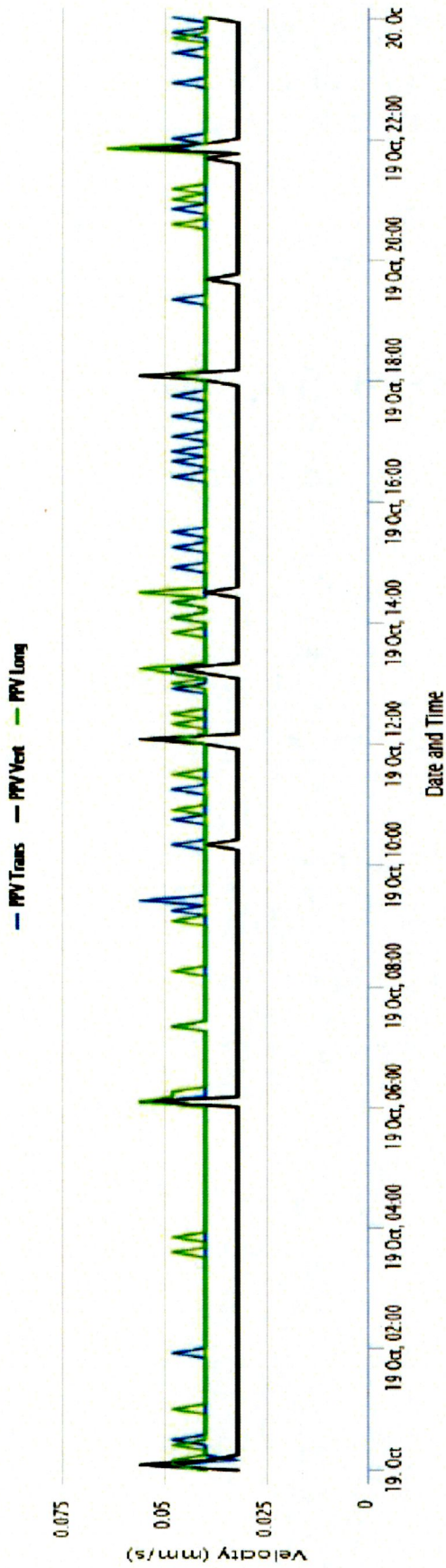
APPENDIX I

HOURLY LAEQ NOISE DATA AT N1



APPENDIX I

RECORDED VIBRATION DATA AT N1



APPENDIX III

CERTIFICATE OF MEMBERSHIP TO THE INSTITUTE OF ACOUSTICS



Certificate of Membership

This is to certify that

Ian Byrne

has been elected as a

Member

of the
Institute of Acoustics

*Given under the seal of the Institute
in accordance with the
Articles of Association and By-Laws*

President

A handwritten signature in black ink, appearing to read "Stephen Turner".

Institute Secretary

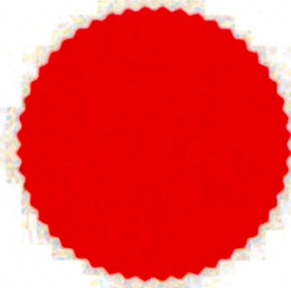
A handwritten signature in black ink, appearing to be a cursive name.

Valid Until

28-02-2023

Membership Number

44543



The certificate remains the property of the Institute and shall be returned to the Institute on demand.
Membership of the Institute is subject to annual renewal

The Institute of Acoustics Limited, one floor, 54 Peter's House, 43-49 Victoria Street, St Albans, Hertfordshire AL1 1JQ
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Company No: 02069046 Registered in England No: 103998 Registered Charity No: 262704

Byrne Environmental
CONSULTING LTD

Kelland Homes - Clonburris SDZ
Acoustic Design Statement

APPENDIX IV

SOUND LEVEL METER & VIBRATION METER CALIBRATION CERTIFICATE



Statement of Calibration

Issued to:

Byrne Environmental Consulting
Red Bog
Skryne Road
Dunshaughlin
Co. Meath

Calibration Reference

SLM210126

Test Date: 29/01/2021

Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	Model	Type 2250-L
Make:	Bruel & Kjaer	Serial Number:	2550421

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

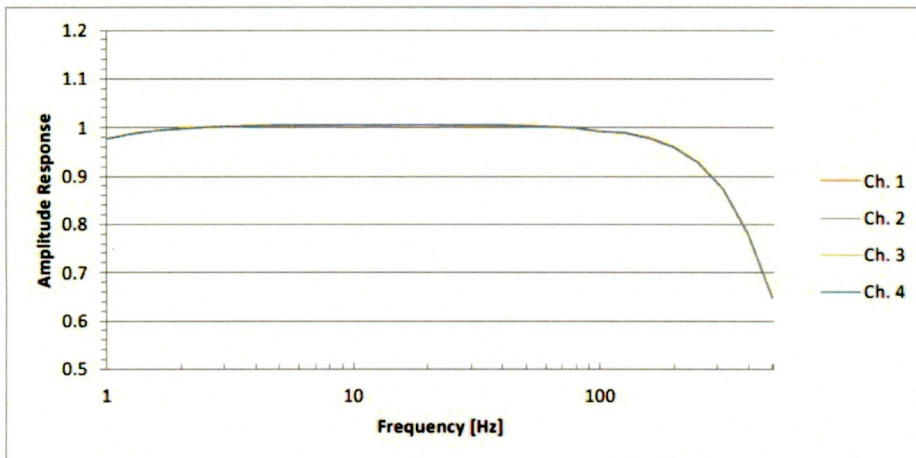
Unit 2, Goldenbridge Industrial Estate, Inchicore, Dublin 8, D08 YY38
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Byrne Environmental
CONSULTING LTD

Kelland Homes - Clonburris SDZ
Acoustic Design Statement

AvaTrace Certificate of Calibration

Model: AvaTrace
 Serial number: 9258
 Date: 03/08/2022 12:25
 Calibration result: All Channels passed on all frequencies.



Sonitus Systems certifies that, at the time of test, the above product was calibrated in accordance with applicable AVA Monitoring AB procedure. These procedures are designed to assure that the product meets AVA Monitoring's specifications.

The above product should be calibrated at least every second year or according to applicable regulations.

The standards used in this calibration are traceable to SP, NIST and/or other national measurement institutes.

Instrumentation used:

Make	Model	Serial	Cal. cert
National Instruments	USB-6289	1F660B2	6658200

Calibration Certified by: Sarah Cullen



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