Byrne Environmental
CONSULTING LTD

ENVIRONMENTAL MONITORING, ASSESSMENT & MANAGEMENT
Acoustics, Air Quality, Environmental Impact Assessment
& Waste Management Specialists

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ACOUSTIC DESIGN STATEMENT

FOR

CAIRN HOMES PROPERTIES LTD
45 MESPIL ROAD
DUBLIN 4

RELATING TO A PROPOSED

DEVELOPMENT

AT

CLONBURRIS SDZ
PHASE T2

12th December 2022

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

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1.0 INTRODUCTION

This Acoustic Design Statement (ADS) has been prepared on behalf of CAIRN Homes Properties Ltd and presents an assessment of the inward noise impact of rail and road traffic noise on the proposed Clonburris SDZ T2 development site.

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 subject site is located within the Clonburris SDZ in South County Dublin. The subject site is currently undeveloped and is bordered to the North by the Dublin-Cork Railway Line. Lands to the south and west are currently undeveloped SDZ lands. The Fonthill Road borders the eastern site boundary and the Irish Rail Clondalkin/Fonthill Train Station is located to the north east of the site.

The Dublin-Cork Rail Line and the Fonthill Road are the principal existing ambient noise sources that impact the subject site.

Figure 1 SDZ T2 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

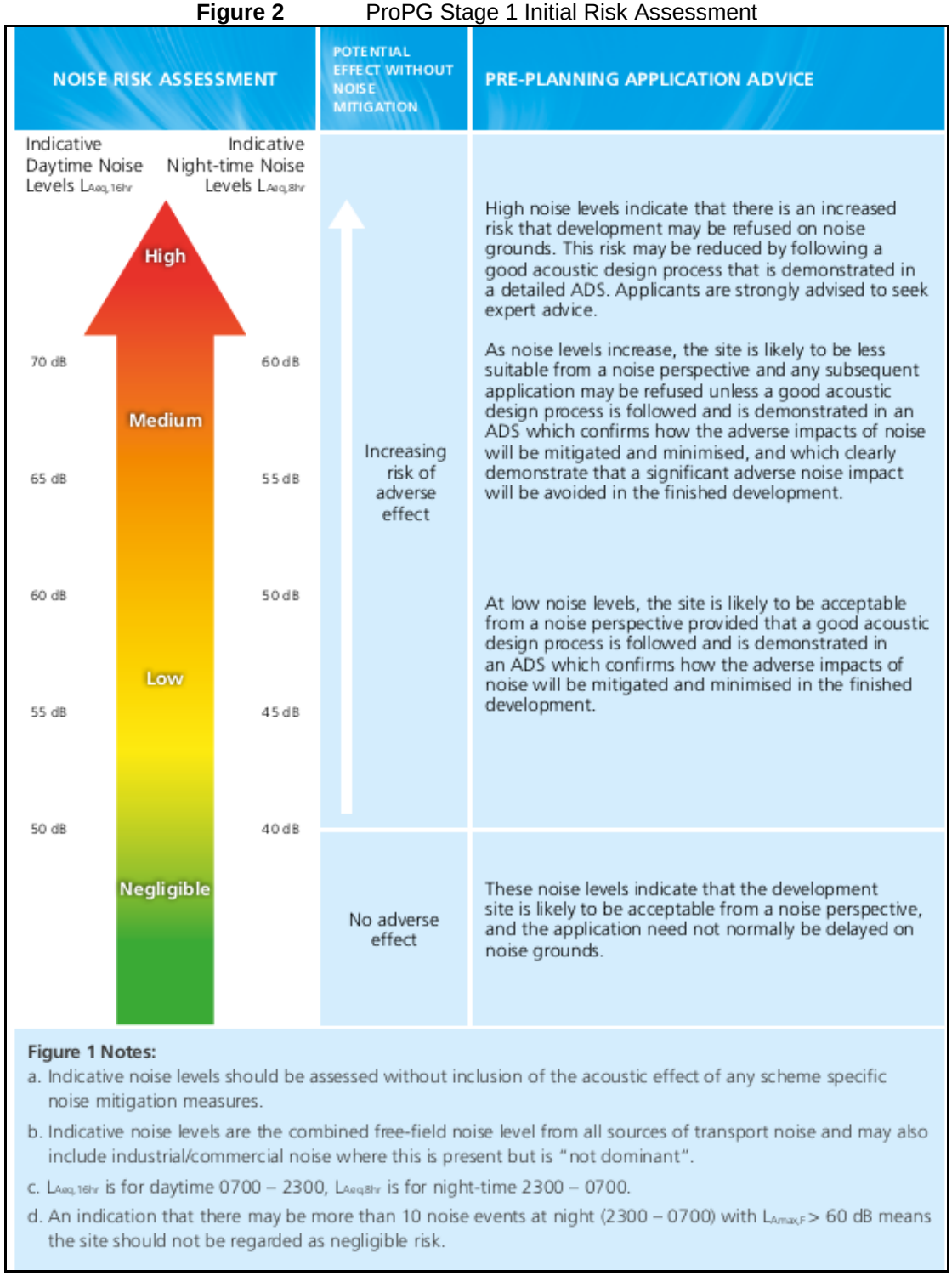
The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 2 presents the basis of the initial noise 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 $L_{Aeq, 16hr}$	NA
Dining	Dining Room/Area	40 dB $L_{Aeq, 16hr}$	NA
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq, 16hr}$	30 dB $L_{Aeq, 8hr}$ 45 dB L_{AFmax}
External Amenity	Garden	50-55 dB $L_{Aeq, 16hr}$	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.*

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. Enhanced logging software was used to calculate the Lden and Lnight values automatically.

Appendix II details the Calibration Certificate of the *B&K 2250* Sound Level Meter used for the survey.

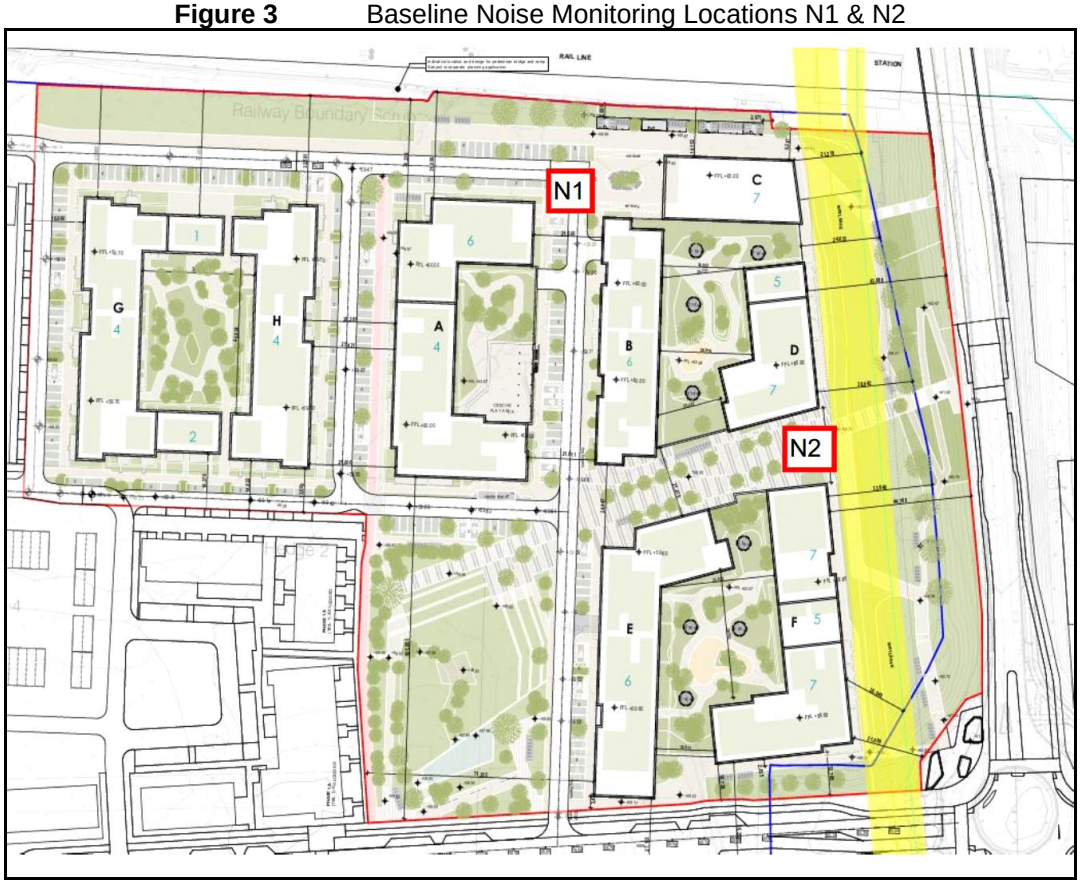
Noise Measurement Locations

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. 40m from the closest rail track as indicated as N1 in Figure 3 below. Noise measurements were also conducted at the closest building façade footprint facing towards the Fonthill Road N2 at a height of c. 6m (to represent 1st floor bedroom level) at a distance of c. 45m from the Fonthill Road as shown in Figure 3 below.

Existing Ambient Noise Sources

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

Figure 3 Baseline Noise Monitoring Locations N1 & N2



Note Block C is commercial and non-residential

6.0 BASELINE NOISE SURVEY RESULTS

Baseline noise levels were measured between 19th - 21st 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.

Tables 2 & 3 present the measured noise levels as LAeq, 16-hour and LAeq, 8-hour values.

Table 2 Location N1 Northern Site opposite Dublin-Cork Rail Line

Parameter	Measured sound pressure levels dBA (re 20µPa)	
	Daytime $L_{Aeq,,\ 16hr}$	Nightime $L_{Aeq,8hr}$
Measured Value	60	48
ProPG Risk Assessment	Low	Low

Table 3 Location N2 Eastern Site opposite Fonthill Road

Parameter	Measured sound pressure levels dBA (re 20µPa)	
	Daytime $L_{Aeq,,\ 16hr}$	Nightime $L_{Aeq,8hr}$
Measured Value	56	42
ProPG Risk Assessment	Low	Low

7.0 DISCUSSION OF RECORDED NOISE LEVELS

Rail Noise

The recorded Daytime $L_{Aeq,\ 16hr}$ and Night time $L_{Aeq,\ 8hr}$ values at the footprint of the closest residential dwelling to the rial line were 60 and 48 dB(A) respectively which are in the Low risk range of the ProPG Assessment.

The highest recorded night time L_{AFmax} value was 84dB(A) and L_{AFmax} values over 80 dB(A) occurred on more than 10 occasions during the night time period.

Road Noise

The recorded Daytime $L_{Aeq,\ 16hr}$ and Night time $L_{Aeq,\ 8hr}$ values at the footprint of the closest residential dwelling to the Fonthill Road were 56 and 42 dB(A) respectively which are in the Low risk range of the ProPG Assessment.

The highest recorded night time L_{AFmax} value was 81dB(A) and L_{AFmax} 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

8.1 Units facing towards Rail Line

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 3 below details the sound insulation required for glazing to ensure that the internal noise levels the internal noise limit criteria as specified in *BS 8233:2014.*

Table 4 Assessment of Sound Insulation Requirements for units facing rail line

Assessment Location	Daytime $L_{Aeq,,\ 16hr}$	Night time $L_{Aeq,8hr}$	Required Façade Attenuation Rw dB	Predicted Internal Noise Level (Daytime Limit 35dB LAeq, 16hr)	Predicted Internal Noise Level (Night time Limit 30dB LAeq, 8hr)
Northern Facades facing towards Rail Line	60	48	25	35	30
	Night time L_{AFmax}		Minimum Façade Attenuation Rw dB	Predicted Internal Noise Level Limit 45db LAFmax	
	84 L_{AFmax}		39	45 L_{AFmax}	

The measured L_{AFmax} values during the night time period dictate a minimum sound insulation rating (Rw) of 39dB(A) for glazing on properties fronting towards the rail line.

Glazing
The northern façades of the apartments facing towards the rail track shall include acoustically rated glazing with a minimum Rw value of 39dB as indicated in Table 3 below 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.

8.1 Units facing towards Fonthill Road

The inward noise impact from road traffic noise on the eastern 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 3 below details the sound insulation required for glazing to ensure that the internal noise levels the internal noise limit criteria as specified in *BS 8233:2014.*

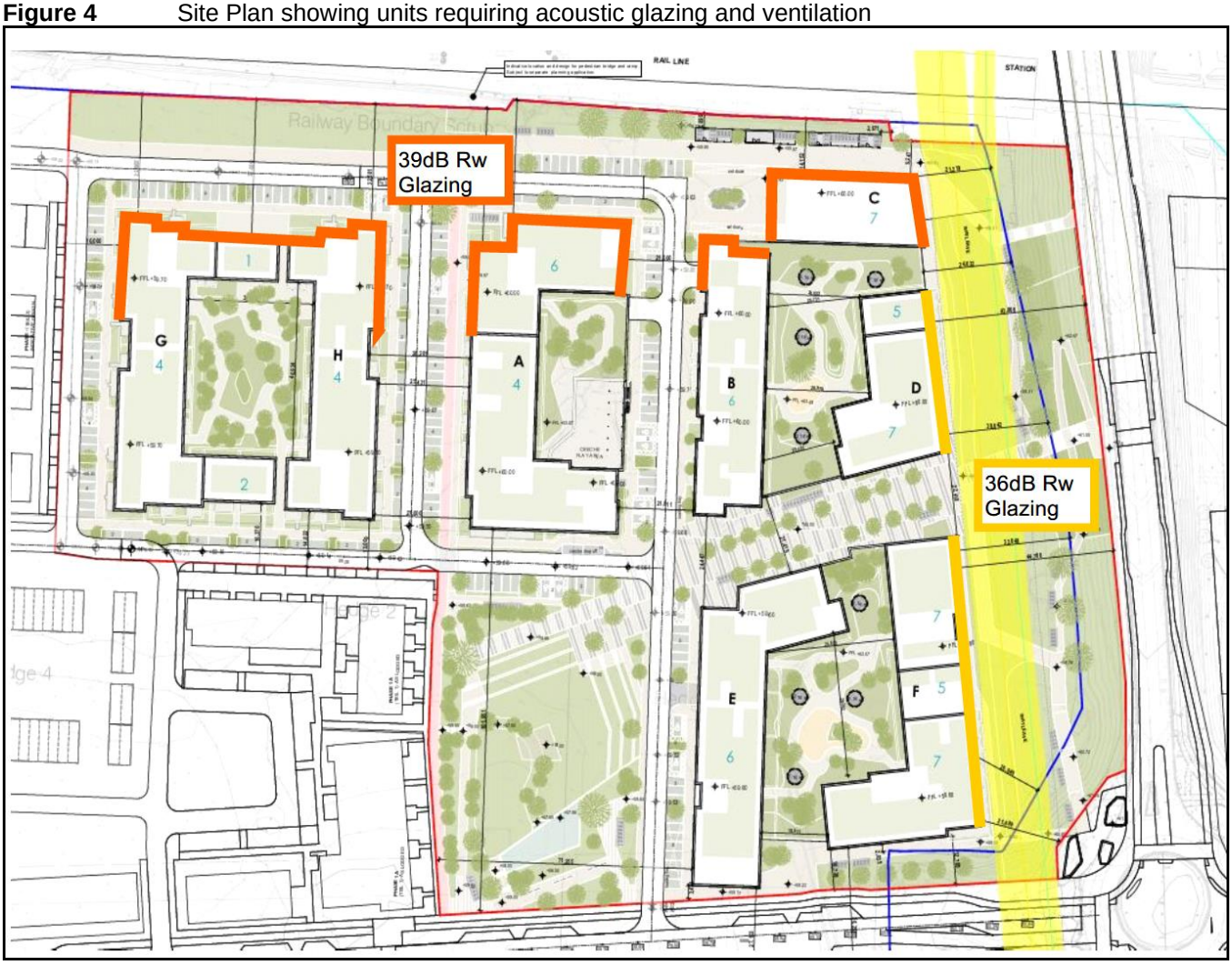
Table 4 Assessment of Sound Insulation Requirements for units facing towards Fonthill Road

Assessment Location	Daytime $L_{Aeq,, 16hr}$	Night time $L_{Aeq,8hr}$	Required Façade Attenuation Rw dB	Predicted Internal Noise Level (Daytime Limit 35dB LAeq, 16hr)	Predicted Internal Noise Level (Night time Limit 30dB LAeq, 8hr)
Eastern Facades facing towards Fonthill Road	56	42	21	35	30
	Night time L_{AFmax}		Minimum Façade Attenuation Rw dB	Predicted Internal Noise Level Limit 45db LAFmax	
	81 L_{AFmax}		36	45 L_{AFmax}	

The measured L_{AFmax} values during the night time period dictate a minimum sound insulation rating (Rw) of 36dB(A) for glazing on properties fronting towards the Fonthill Road.

Glazing
The eastern façades of the apartments facing towards the Fonthill Road shall include acoustically rated glazing with a minimum Rw value of 36dB as indicated in Table 4 below 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.

Figure 4 Site Plan showing units requiring acoustic glazing and ventilation



Ventilation
Ventilation installations are to be acoustically treated, in the form of suitably approved and tested acoustic attenuation systems if required to maintain the acoustic integrity of the facade.

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.*

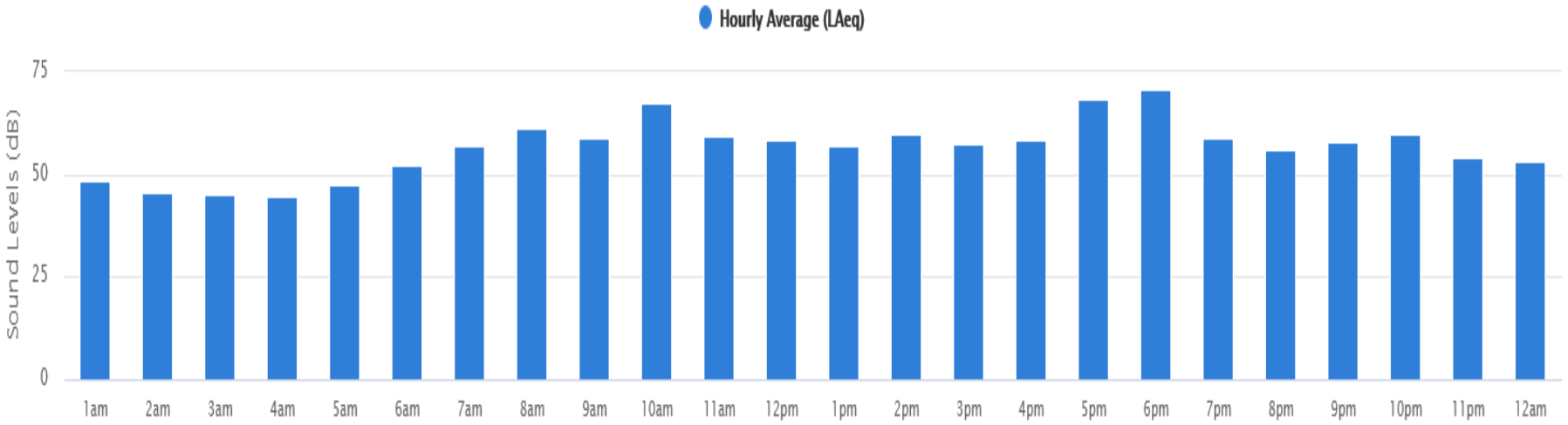
Existing daytime and nightime noise levels have been established by conducting noise measurements on-site at the proposed closest façade of properties to the Dublin-Cork Rail Line located to the north of the site and the Fonthill Road to the East of the site.

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.

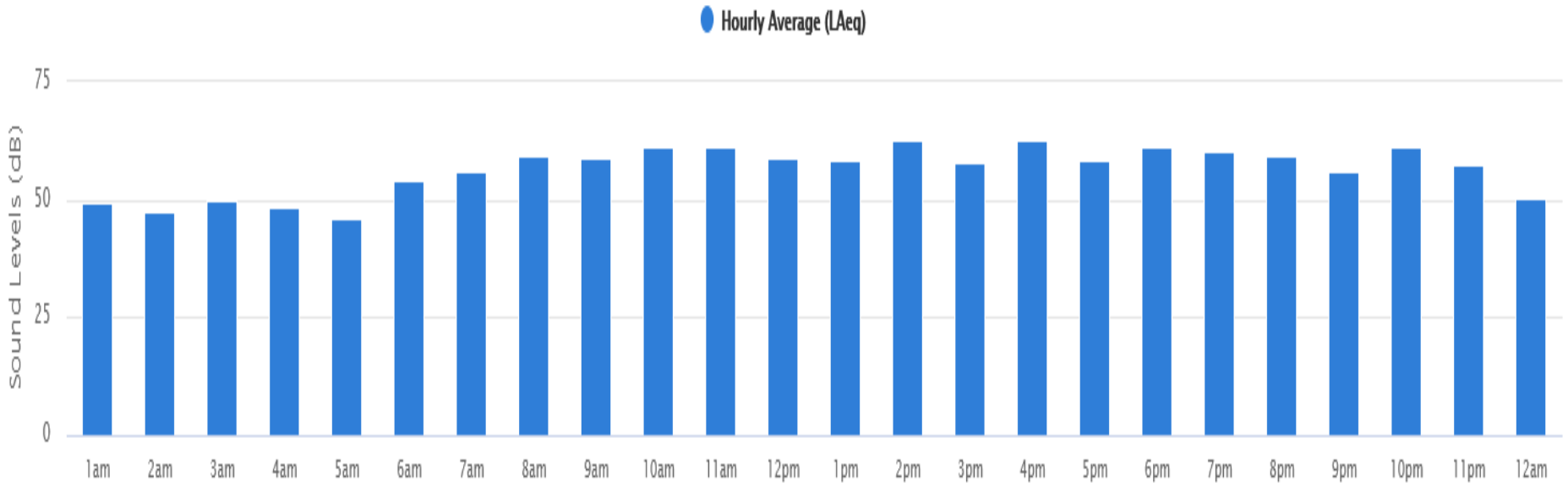
In order mitigate the inward noise impact and achieve the internal acoustic design criteria specified in *BS 8233:2014*, specific mitigation measures including acoustically rated windows shall be integrated into the design of all building facades fronting towards the Dublin-Cork rail line and the Fonthill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

APPENDIX I

HOURLY LAEQ NOISE DATA AT N1

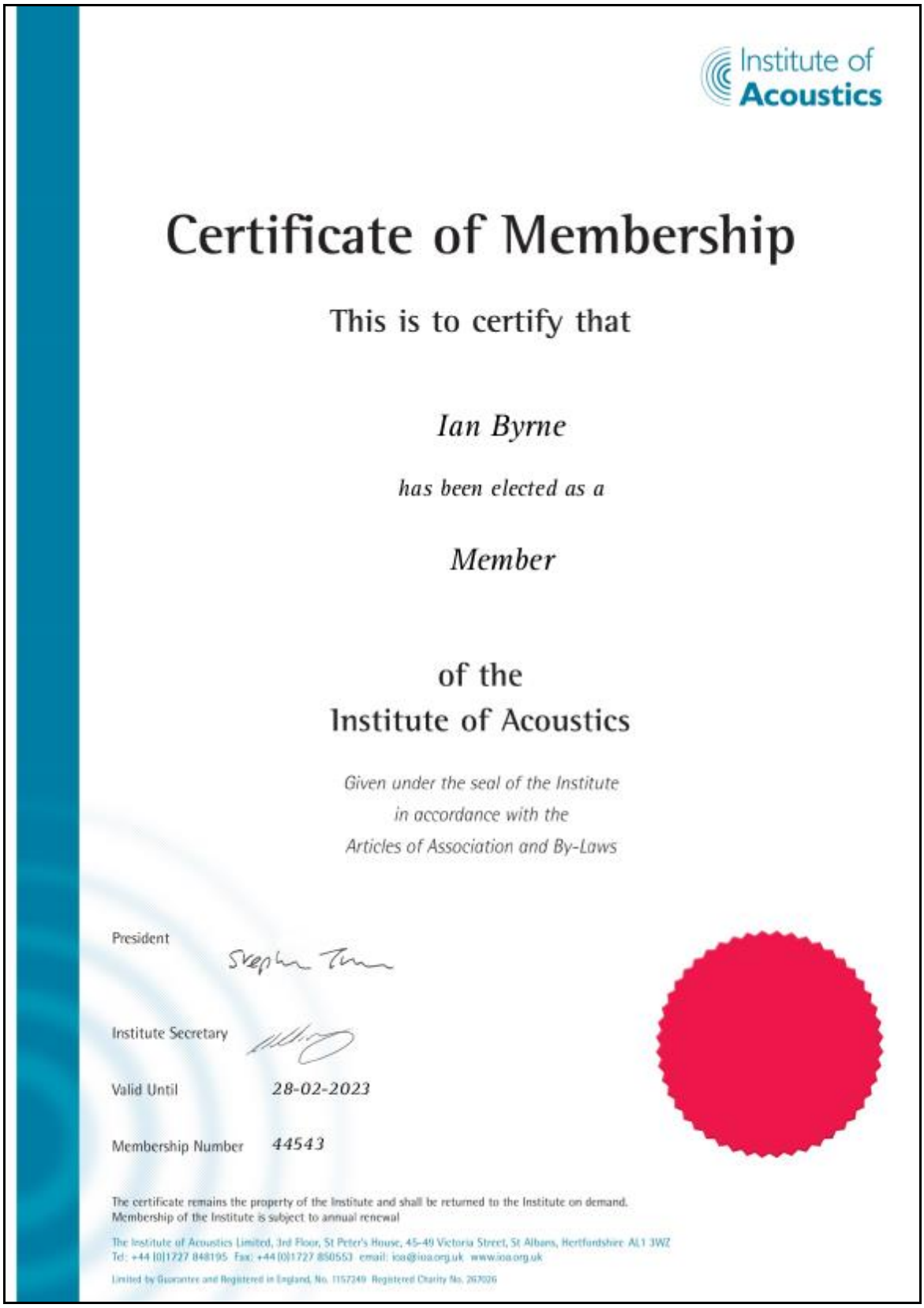


HOURLY LAEQ NOISE DATA AT N2



APPENDIX II

CERTIFICATE OF MEMBERSHIP TO THE INSTITUTE OF ACOUSTICS



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

Institute Secretary

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

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APPENDIX III

SOUND LEVEL METER CALIBRATION CERTIFICATE

SONITUS SYSTEMS

Statement of Calibration

Issued to:	Calibration Reference
Byrne Environmental Consulting Red Bog Skryne Road Dunshaughlin Co. Meath	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:

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