



Liscove Limited

LANDS AT WAYSIDE, KILTERNAN DUBLIN 18, KILTERNAN VILLAGE SHD

ProPG: Acoustic Design Statement

603552 (02)

JUNE 2022

RSK

EXECUTIVE SUMMARY

RSK Ireland Limited (RSK) was instructed by Liscove Limited to conduct a noise impact assessment in respect of a proposed SHD at lands at Wayside, Enniskerry Road and Glenamuck Road, Kilternan, Dublin 18.

This document considers the potential impact of the existing and future noise sources on future residents of the proposed dwellings, along with an assessment of the potential operational phase noise impact of the proposed development to nearby existing receptors.

To assist with this assessment, the baseline noise environment at the development site has been determined through noise surveys between 13th and 14th May and on 20th May 2022.

This report considers the potential impact of existing traffic and future Glenamuck District Roads Scheme (GDRS) traffic noise on the proposed development. The baseline noise survey has been used to assess the sites noise risk category, as per the ProPG “Stage 1” assessment. The noise risk category for the proposed development facades that are most exposed to road traffic is **Negligible to Medium** for daytime and **Negligible to Medium/High** for night-time periods. This indicates that *the site is likely to be acceptable from a noise perspective* subject to the inclusion of suitable noise conditions.

Requirements to mitigate noise emissions, as specified in the ProPG “Stage 2” Acoustic Design Statement, are as follows:

- Provision of glazing with minimum sound insulation properties as outlined in Table 12 of this document, and;
- Provision of acoustically attenuated ventilation with minimum sound insulation properties as outlined in Table 13 of this document.

In the developments operational phase, criteria have also been set for any new building services plant items plant (i.e. such as may be required to service the retail/commercial elements of the proposed neighbourhood centre), to both existing and future residents, in accordance with the methodologies outlined in BS 4142:2014+A1:2019. It has been concluded that the likely noise impact of the developments in its operational phase are not significant.

In summary, once consideration is given to the range of mitigation measures outlined in this report, the expected noise impact of the proposed development, on existing and future residents, is not significant.



RSK GENERAL NOTES

Project No.: 603552 (01)


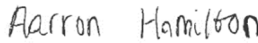
Title: Lands at Wayside, Kilternan Dublin 18. Noise Impact Assessment

Client: Liscove Limited

Date: 16th June 2022

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Status: **FINAL**

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Ireland Ltd.

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1 INTRODUCTION

Liscove Limited instructed RSK to conduct an assessment of the potential noise impact associated with the proposed residential development. The potential inward noise impact of existing and future traffic noise on the proposed development has been considered in this report.

Mitigation measures are included, where relevant, to ensure the proposed development is operated in an environmentally sustainable manner in order to ensure its minimal impact on the receiving noise climate.

1.1 Aim and Objectives

The aim of the assessment is as follows:

- Quantify the baseline noise environment at locations that are representative of nearby noise sensitive locations.
- Provide an assessment of the likely impacts of operational phase noise emissions to nearby existing receptors.
- Provide design advice and recommendations for mitigation measures, where necessary, to reduce impacts to an appropriate level for future dwelling occupants.

The objective of this assessment is to reduce the risk of nuisance to nearby noise sensitive locations resulting from operational phase noise emissions and to provide a performance specification for the proposed buildings façades to control road traffic noise ingress to the proposed dwellings.

2 THE PROPOSED DEVELOPMENT

Liscove Limited intend to apply to An Bord Pleanála for permission for a strategic housing development at this c. 10.8 Ha site at lands at Wayside, Enniskerry Road and Glenamuck Road, Kiltarnan, Dublin 18.

The development will principally consist of: the demolition of c. 573.2 sq m of existing structures on site comprising a derelict dwelling known as ‘Rockville’ and associated derelict outbuildings; and the provision of a mixed use development consisting of 383 No. residential units (165 No. houses, 118 No. duplex units and 100 No. apartments) and a Neighbourhood Centre, which will provide a creche (439 sq m), office (317 sq m), medical (147 sq m), retail (857 sq m), convenience retail (431 sq m) and a community facility (321 sq m). The 383 No. residential units will consist of 27 No. 1 bedroom units (19 No. apartments and 8 No. duplexes), 128 No. 2 bedroom units (78 No. apartments and 50 No. duplexes), 171 No. 3 bedroom units (108 No. houses, 3 No. apartments and 60 No. duplexes) and 57 No. 4 bedroom units (57 No. houses). The proposed development will range in height from 2 No. to 5 No. storeys (including podium/undercroft level in Apartment Blocks C and D and in the Neighbourhood Centre).

The site setting is predominately in a mixed residential area with nearby dwellings to the north, east, south and west of the site. The R117 runs along the site’s western boundary and the proposed new Glenamuck District Roads Scheme (GDRS) adjoins part of the development’s eastern boundary. The north-western corner of the site adjoins a site that currently appears to operate as a car dealership and solid fuel depot, which includes some commercial/industrial use.

Figure 1 shows the proposed site location in the context of the surrounding environment.

Figure 1: Proposed Site Layout Plan (inc. proposed GDRS)



3 BASELINE NOISE SURVEY

Environmental noise surveys have been conducted on site in order to establish the baseline noise environment. Noise surveys have been conducted in accordance with ISO 1996-2:2017 “Acoustics -- Description, measurement and assessment of environmental noise -- Part 2: Determination of sound pressure levels”.

3.1 Monitoring Location

Unattended noise measurements were conducted at Location N1. Attended noise measurements were conducted at locations N2 – N4. The approximate noise measurement location is shown in Figure 2. A photograph of the measurement position can be seen below.

Figure 2: Proposed Site Plan Showing Baseline Monitoring Position



Location N1 to the southwest of the site with the microphone positioned at a location representative of the proposed development facade that is closest to the R117 Road. This noise survey position comprised of unattended monitoring for an approximate 24-hr period. Noise data captured at this location is used as reference in order to estimate noise levels at the proposed development façade during both day and night-time periods.



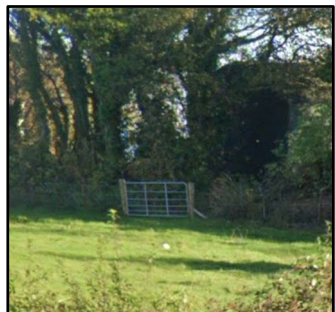
Location N2 to the south of the site with the microphone positioned at ground floor level at a location representative of a proposed development facade. This noise survey position comprised attended daytime monitoring.



Location N3 to the north east of the site with the microphone positioned at ground floor level at a location representative of the proposed development facade that is close to the new proposed road and nearby existing residents. This noise survey position comprised attended daytime monitoring.



Location N4 to the north of the site with the microphone positioned at ground floor level at a location representative of a proposed development façade and proposed amenity space. This noise survey position comprised attended daytime monitoring.



3.2 Survey Periods

Noise measurements were conducted over the source of the following periods:

Table 1: Noise Survey Periods

Period	Location	Date	Start Time	Stop Time
Daytime 07:00 – 23:00hrs	N1	13 - 14 May 2022	13 May at 15:07	14 May at 15:00
	N2 – N4	20 May 2022	20 May at 12:30	12 May at 19:05
Night-time 23:00 – 07:00hrs	N1	13 - 14 May 2022	13 May at 23:00	14 May at 07:00

3.3 Weather

The weather during the surveys of 13th -14th and 20th May 2022 is summarised as follows (ref. <https://www.met.ie/climate/available-data/daily-data>) from the Casement met station.

Table 2: Weather Conditions

Date	Period	Temperature Degrees Celsius	Precipitation	Wind m/s	Speed	Wind Direction
13/05	Daytime	10 – 18	No	8 – 11		WSW
13-14/05	Night- time	9 – 10	No	8 – 9		SW
14/05	Daytime	10 – 18	No	4 – 11		W
20/05	Daytime	17 - 18	No	3 - 4		SW

In line with best practice, periods of rain and elevated winds have been omitted from the study.

3.4 Instrumentation

The noise measurements were undertaken using the following equipment.

Table 3: Survey Equipment

Equipment	Type	Serial No.
Class 1 Sound Level Meter	Rion NL - 52	00710314
Class 1 Sound Level Meter	LXT 831	0006263

The equipment used has a calibration history that is traceable to a certified calibration institution. The calibration of the sound level meter was field checked prior to commencing measurements and prior to removing the equipment from site upon completion. A calibration drift of -0.1dB was noted upon commencement of the survey and +0.1 upon survey completion. The sound level meter calibration certificates are included in Appendix B.

The sound level meter conformed to the Class 1 requirements of BS EN 61672-1:2013 'Electroacoustics. Sound level meter, Specifications'. The calibrator used conforms to the requirements of BS EN IEC 60942:2018 'Electroacoustics. Sound calibrators'.

3.5 Measurement Parameters

The noise survey results are presented in decibels (dB), using the following parameters:

- $L_{Aeq,T}$ is the equivalent continuous sound level and is used to describe a fluctuating sound as a single value over the sample period (T).
- $L_{AFmax,T}$ The maximum A-weighted sound pressure level occurring within a specified time period (T). Measured using the "Fast" time weighting.
- $L_{AF10,T}$ Refers to those A-weighted noise levels in the top 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period (T). It is used to determine the intermittent high noise level features of locally generated noise and usually gives an indicator of the level of road traffic. Measured using the "Fast" time weighting.
- $L_{AF90,T}$ Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval (T). It is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to describe a background level without contribution from intermittent sources.

All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa. Noise measurements use a reference time period (T) of 15-minutes.

3.6 Measurement Results

3.6.1 Location N1

Table 4 summarises the measured daytime (i.e. 07:00 to 23:00) noise levels at Location N1.

Table 4: Measured Daytime Noise Levels at Location N1

Period	Date	Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}	
Daytime	13/05	15:00 - 16:00	65	84	65	51	Local and distant road traffic dominant
		16:00 - 17:00	63	78	67	52	
		17:00 - 18:00	62	76	66	49	
		18:00 - 19:00	61	76	66	48	
		19:00 - 20:00	60	76	64	46	
		20:00 - 21:00	60	80	64	43	
		21:00 - 22:00	59	77	62	40	
	22:00 - 23:00	56	76	60	35		
	14/05	07:00 - 08:00	58	78	61	38	

Period	Date	Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
		08:00 – 09:00	60	84	64	42	
		09:00 – 10:00	60	80	64	46	
		10:00 – 11:00	60	86	64	48	
		11:00 – 12:00	60	75	64	48	
		12:00 – 13:00	60	76	64	47	
		13:00 – 14:00	61	96	64	44	
		14:00 – 15:00	61	87	64	44	

The daily daytime ambient noise levels were in the range 56 to 65 dB L_{Aeq,1hr}. Road traffic movements were noted to be the dominant source of noise at this measurement position.

Table 5 summarises the measured night-time (i.e. 23:00 to 07:00hrs) noise levels at Location N1.

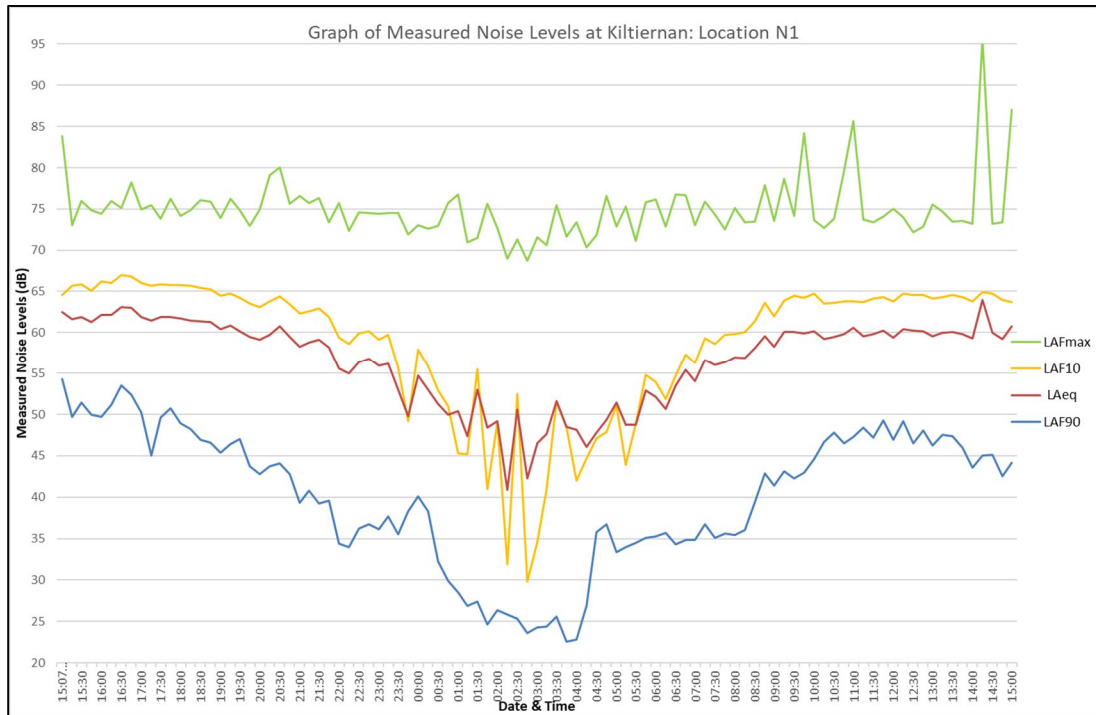
Table 5: Measured Night-time Noise Levels at Location N1

Period	Date	Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Night-time	13/05	23:00 - 00:00	54	75	56	37	Local and distant road traffic dominant
	14/05	01:00 – 02:00	53	76	54	35	
		02:00 – 03:00	50	77	47	27	
		03:00 – 04:00	48	73	41	25	
		04:00 – 05:00	49	75	44	24	
		05:00 – 06:00	48	77	45	31	
		06:00 – 07:00	51	76	50	34	

The night-time ambient noise levels were in the range 48 to 54 dB L_{Aeq,1hr}. Local and distant road traffic were dominant noise sources during night-time period.

Figure 3 shows the time-history graph of measured noise levels between 13th and 14th May 2022 at Location N1. Raw data for the unattended noise survey conducted at Location N1 is included in Appendix C.

Figure 3: Profile of Baseline Noise Monitoring Results at Location N1 (13 – 14 May 2022)



3.6.2 Location N2

Table 6 summarises the measured noise levels at Location N2.

Table 6: Measured Noise Level at Location N2

Period	Date	Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Daytime	20/05	11:34	61	84	59	47	Distant and local road traffic dominant.
		11:49	54	62	57	45	
		12:04	56	75	59	48	

The daytime ambient noise levels were in the range 54 to 61 dB L_{Aeq,15min}. Road traffic was the dominant source of noise. Construction noise, birdsong, treesong, cows and children playing nearby were also audible as secondary sources.

3.6.3 Location N3

Table 7 summarises the measured noise levels at Location N3.

Table 7: Measured Noise Level at Location N3

Period	Date	Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Daytime	20/05	10:21	53	57	55	48	Distant and local road traffic dominant
		10:36	53	68	56	49	
		10:51	54	72	56	49	

The daytime ambient noise levels were in the range 53 to 54 dB L_{Aeq,15min}. Road traffic was the dominant source of noise. Construction noise, birdsong, treesong and children playing nearby were also audible as secondary sources.

3.6.4 Location N4

Table 8 summarises the measured noise levels at Location N4.

Table 8: Measured Noise Level at Location N4

Period	Date	Start Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)				Notes
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	
Daytime	20/05	10:11	53	67	55	49	Distant and local road traffic dominant
		10:26	55	65	58	51	
		10:41	55	64	57	51	

The daytime ambient noise levels were in the range 53 to 55 dB L_{Aeq,15min}. Road traffic was the dominant source of noise. Construction noise, birdsong, treesong and children playing nearby were also audible as secondary sources.

4 NOISE CRITERIA

In deriving noise criteria for the development, consideration has been given to the following documents:

- *Dublin Agglomeration Environmental Noise Action Plan (2018 – 2023): Volume 2, Dun Laoghaire – Rathdown County Council.*
- Dún Laoghaire-Rathdown County Development Plan 2022-2028
- *The Professional Guidance on Planning & Noise (ProPG), May 2017.*
- BS 8233 *Guidance on sound insulation and noise reduction for buildings.*
- BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound.*

4.1 Local Authority Guidelines

4.1.1 Dublin Agglomeration Environmental Noise Action Plan (2018 – 2023): Volume 2, Dun Laoghaire – Rathdown County Council

With regard to inward noise impact on the proposed dwellings reference is made to The *Dublin Agglomeration Environmental Noise Action Plan, December 2018 – July 2023, Volume 2, Dún Laoghaire-Rathdown County Council (NAP)* provides guidance for the scenario whereby a residential development is proposed in an area exposed to pre-existing levels of environmental noise. Section 8.2.3 discusses *Noise in the Planning Process*, and this section is reproduced below:

“8.2.3 Noise in the Planning Process

The planning system has the potential to exercise a significant influence on the control of future exposure to environmental noise and can play a key role in the improvement of amenity. The appropriate use of the planning system can help avoid, or minimise, the adverse impacts of noise without placing unreasonable restrictions on development. Scope exists within the planning and development management process to manage increased levels of noise arising from new development where exposure levels can be harmful to health.

There are two main scenarios in development where noise could be considered as being a material issue, namely:

1) Introducing people into potentially noisy areas through the provision new residential housing, hospital, schools nursing homes etc in the vicinity of existing road rail industrial or airport noise, or where there are potential high levels of noise with buildings or in adjoining gardens or public open spaces.

2) Introducing potentially noisy developments such as new or altered roads, railways, industrial sites, and airports, commercial or large sporting recreational developments into the vicinity of noise sensitive locations.

In the scenario where new residential development or other noise sensitive development is proposed in an area with an existing climate of environmental noise, there is currently no clear national guidance on appropriate noise exposure levels. The EPA has suggested that in the interim that Action Planning Authorities should examine the planning policy guidance notes issued in England titled, „ProPG Planning and Noise: Professional Practice Guidance on Planning and Noise“. This has been produced to provide practitioners with guidance on

a recommended approach to the management of noise within the planning system in England”.

The noise levels measured on site will therefore be compared to relevant guidance for assessing the suitability of the site for residential development i.e. ProPG: *ProPG: Professional Practice guidance on Planning and Noise for new Residential Development* (May 2017).

4.1.2 Dún Laoghaire-Rathdown County Development Plan 2022-2028

Section 12.9.2 *Noise Pollution and Noise Nuisance* of the Dún Laoghaire-Rathdown County Development Plan 2022-2028 states the following in relation to a scenario where a residential development is located in an area potentially exposed to environmental noise sources.

“To require developers to produce an Acoustic Design Assessment (informed by guidance such as is set out in ‘ProPG Planning and Noise’, 2018, as referenced in the ‘Dublin Agglomeration Noise Action Plan 2018 – 2023’), where a noise-sensitive use is proposed in an area that may have high pre-existing environmental sound levels”.

4.2 ProPG: Professional Practice Guidance on Planning and Noise for new Residential Development

ProPG provides a two staged approach for evaluating noise exposure on a proposed residential development. The two stages of the approach can be summarised as follows:

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

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, and;

Element 4 - Other Relevant Issues.

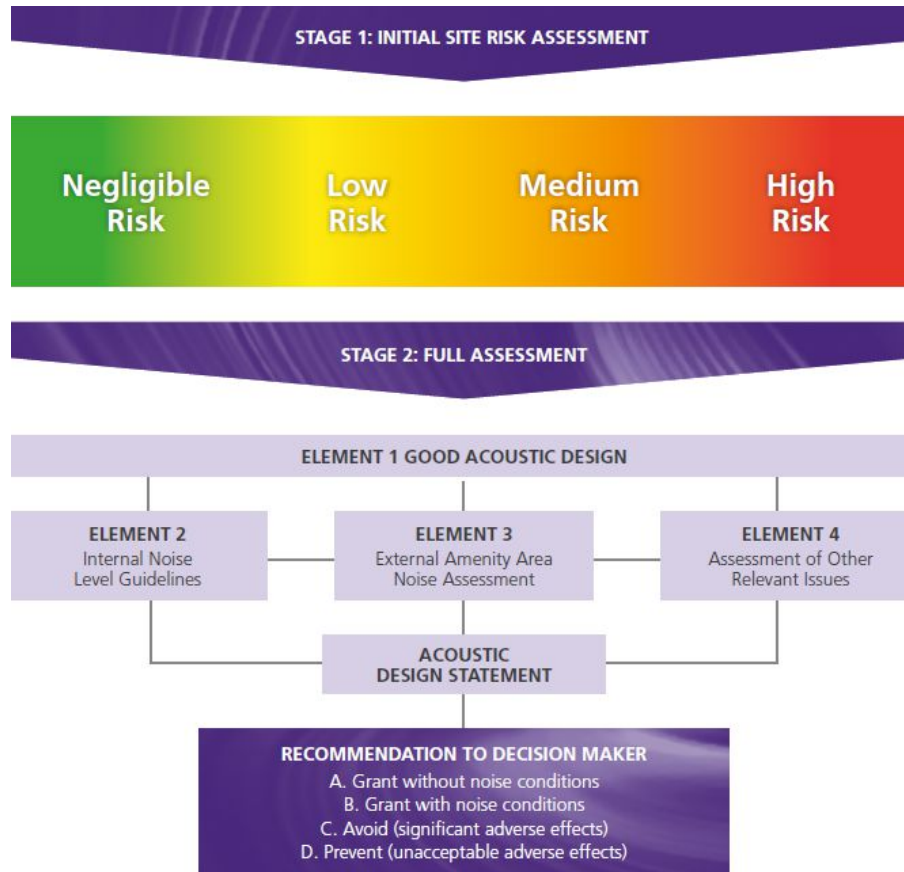
An Acoustic Design Statement (ADS) is then prepared for submission to the planning authority. This ADS outlines the findings of the Stage 1 and Stage 2 assessments; and allows the planning authority to make an informed decision on the suitability of the site for development, with consideration of noise control measures where required. The ProPG document outlines the following potential outcome with respect of the ADS:

- A. Planning consent may be granted without any need for noise conditions;
- B. Planning consent may be granted subject to the inclusion of suitable noise conditions;

- C. Planning consent should be refused on noise grounds in order to avoid significant adverse effects (“avoid”); or,
- D. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects (“prevent”).

A summary of the ProPG approach is illustrated in Figure 4.

Figure 4: ProPG Assessment Strategy (Source: ProPG)



4.2.1 ProPG and BS 8233 *Guidance on sound insulation and noise reduction for buildings*

BS 8233 is referenced in ProPG with regard to internal noise levels within the proposed new dwellings. The following internal noise targets are presented as derived from BS 8233 (2014).

Table 9: ProPG Internal Noise Targets (derived from BS 8233:2014)

Activity	Location	Daytime (07:00 to 23:00hrs)	Night-time (23:00 to 07:00hrs)
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

Activity	Location	Daytime (07:00 to 23:00hrs)	Night-time (23:00 to 07:00hrs)
(daytime resting)			45 dB L _{Amax,T} *

* internal L_{Amax,T} noise level may be exceeded up to 10 times per night without a significant impact occurring.

4.2.2 ProPG and BS 4142 *Methods for rating and assessing industrial and commercial sound*

Given that there are commercial buildings and used in the vicinity, it is appropriate also to consider the guidance provided in BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*. ProPG states the following *in the case of sites exposed to industrial and/or commercial noise*:

2.13 *As stated in the Introduction, the scope of this ProPG is restricted to sites that are exposed predominantly to noise from transportation sources. The key concerns regarding new residential development near existing industrial and/or commercial land uses are:*

- *The future occupants of the new noise sensitive development may be subject to adverse effects of noise, and*
- *The existing industrial and/or commercial business may become subject to complaints from future occupants of the new noise sensitive development and at risk of having to modify operations and/or incur additional costs.*

2.14 *In the special case where industrial or commercial noise is present on the site but is “not dominant” (i.e. where the impact would be rated as lower than adverse (subject to context) if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk (and if included, this should be clearly stated).*

2.15 *Where industrial or commercial noise is present on the site and is considered to be “dominant” (i.e. where the impact would be rated as adverse or greater (subject to context) if a BS4142:2014 assessment was to be carried out), then the risk assessment should not be applied to the industrial or commercial noise component and regard should be had to the guidance in BS4142:2014. The judgement on whether or not to undertake a BS4142 assessment to determine dominance should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient.*

The *Southside Autolink* car dealership and *Boyle’s Solid Fuel* in the Sancta Maria property adjoins the developments north-western boundary. This site includes some industrial/commercial use. The baseline noise survey included surveys and site inspections/observations along this boundary. The dominant noise sources observed were road traffic from the surrounding public road network. There were occasional sounds from the adjacent site which included primarily the movement of vehicles. In this instance and based upon a subjective judgement of personnel



conducting the baseline noise surveys, it is concluded that industrial/commercial noise is audible occasionally, but is “not dominant” at any location across the site. As such the contribution to measured noise levels from any industrial or commercial noise is included in the noise level used to establish the ProPG degree of risk, and a separate BS 4142 assessment of industrial or commercial noise is not required.

5 IMPACT OF EXISTING AND FUTURE NOISE SOURCES ON THE PROPOSED DEVELOPMENT

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, and;
- Element 4 - Other Relevant Issues.

ProPG is intended to outline the methodology and findings of the assessments, so as the planning authority can make an informed decision on the permission. ProPG outlines the following possible recommendations in relation to the findings:

- A. Planning consent may be granted without any need for noise conditions;
- B. Planning consent may be granted subject to the inclusion of suitable noise conditions;
- C. Planning consent should be refused on noise grounds in order to avoid significant adverse effects (“avoid”); or,
- D. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects (“prevent”).

The following sections present the results of both the Stage 1 and Stage 2 studies.

5.1 ProPG Stage 1 (Initial Noise Risk Assessment)

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorization of the site as a negligible, low, medium or high risk based on the pre-existing noise environment.

Paragraph 2.9 of ProPG states that,

“The noise risk assessment may be based on measurements or prediction (or a combination of both) as appropriate and should aim to describe noise levels over a “typical worst case” 24 hour day either now or in the foreseeable future.”

5.1.1 Calculated Noise from Existing Sources

In assessing typical noise levels currently present on site, reference is made to the baseline noise survey and associated results presented in Section 3.0.

5.1.2 Calculated Noise from Future Sources

In assessing typical noise levels in the “foreseeable future”, reference is made to the new Glenamuck District Roads Scheme (GDRS) which runs to the north and east of the site and adjoins part of the sites eastern boundary.

In order to assess the potential noise impact of the proposed GDRS, a proprietary road traffic noise model of the site has been developed.

5.1.2.1 Noise Model Details

In order to assess the likely noise emissions from the GDRS, a 3D noise model of the proposed site was developed, using the following information, provided by the design team:

- OS mapping of surrounding environment;
- Layout plans of proposed scheme including boundary treatments, and;
- Supplied traffic data.

The model was developed using a proprietary noise calculation package SoundPLAN. This is an acoustic modelling package for computing noise levels in the vicinity of different types of noise sources. For road traffic noise, the model calculates noise levels in accordance with the UK’s *Calculation of Road Traffic Noise (CRTN - 1988)* standard, and the TRL report ‘*Converting the UK traffic noise index LA10,18h to EU indices for noise mapping*’.

The model takes account of various factors affecting the propagation of sound in accordance with the standard, including:

- The total traffic flow along the road;
- The percentage Heavy Goods Vehicle (% HGV);
- The proposed road surface finish;
- The traffic speed along the road;
- The distance between the source and receiver;
- The presence of obstacles such as screens or barriers in the propagation path;
- The presence of reflecting surfaces;
- The hardness of the ground between the source and receiver;
- Attenuation due to atmospheric absorption, and
- Meteorological effects such as wind gradient, temperature gradient and humidity.

Noise levels have been modelled to the proposed development site. Noise predictions are made to the various floors of the residential buildings.

5.1.2.2 Traffic Flow Data

Atkins have provided the traffic data in relation to the GDRS for the following scenarios:

- Base scenario for the year 2021 (i.e. the estimated current traffic flows along the existing roads).
- Do Something for the year 2039 (i.e. all surrounding roads including the Development of GDRS).

Table 10 presents the provided Annual Average Daily Traffic (AADT) traffic flows for the Roads under consideration which are indicated in Figure 5.

Table 10: Traffic Flow Projections

Road	Description	Location	Year 2039 “Do Something” Scenario (AADT)
Site1	Between J1 and A5	Along Glenamuck Rd	8,990
Site2	Between J1 and A2	Along R117 Enniskerry Rd	5,954
Site3	Between R117 Enniskerry Rd and Proposed Access Junction 2	Along Proposed Access Road A2	286
Site4	Between A2 and A3	Along R117 Enniskerry Rd	6,053
Site5	Between R117 Enniskerry Rd and Proposed Access Junction 3	Along Proposed Access Road A3	286
Site6	Between A4 and J2	Along R117 Enniskerry Rd	5,816
Site7	Between R117 Enniskerry Rd and R116	Along R116 Rd	4,370
Site8	Between J2 and J3	Along R117 Enniskerry Rd	3,318
Site9	Between R117 Enniskerry Rd and Ballycorus Rd	Along R116 Ballycorus Rd	2,797
Site10	After Junction 3	Along R117 Enniskerry Rd	0
Site11	Between A3 and A4	Along Enniskerry Rd	6,240
Site12	Between R117 Enniskerry Rd and Proposed Access Junction 4	Along Proposed Access Rd A4	286
Site13	Between A5 and GDRS road	Along Glenamuck Rd (After A5)	9,262
Site14	North of Access Junction 1	Along GDRS Rd (North)	7,372
Site15	Between GDRS and Access Junction 5	Along Proposed Access Rd A1	1,567
Site16	South of Access Junction 1	Along GDRS Rd (South)	7,520
Site17	Between Glenamuck Rd and A5	Along Proposed Access Rd A5	709

Figure 5: Key to Traffic Link Locations (Source: Atkins)



The hourly Diurnal Profiles for HGV and Non-HGV Traffic have been calculated as per the TII *Guidelines for the Treatment of Noise & Vibration in National Road Schemes*, Appendix 1, *Diurnal Profiles for Non-HCV and HCV Traffic*.

5.1.2.3 Predicted Noise Levels

Figures 6 and 7 present the traffic noise prediction contours for daytime and night-time scenarios to the proposed building façades.

Figure 6: Do Something Noise Contour Plot (2039 inc. GDRS): Daytime

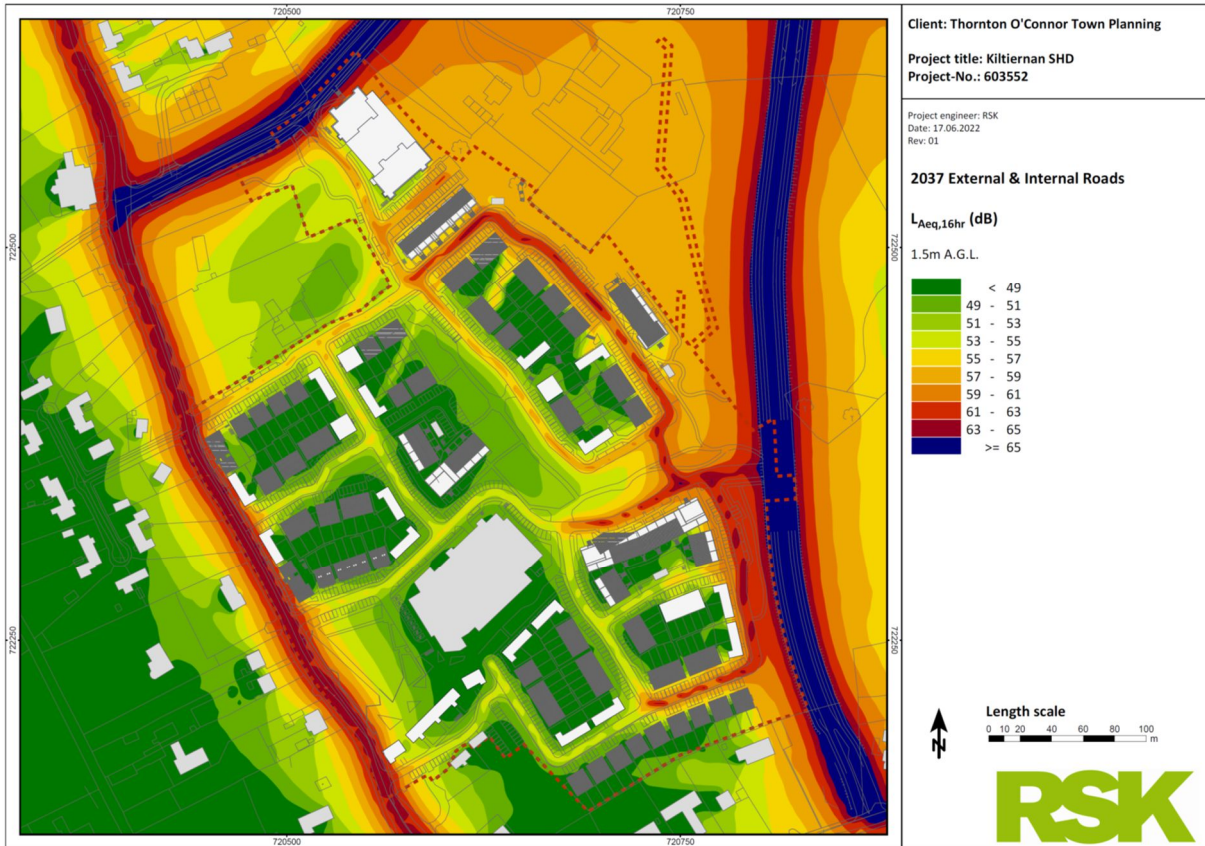


Figure 7: Do Something Noise Contour Plot (2039 inc. GDRS): Night-time



Figure 8 present the traffic noise prediction contours for the daytime scenarios to the proposed development lands for the purposes of the analysis of noise levels in external amenity spaces.

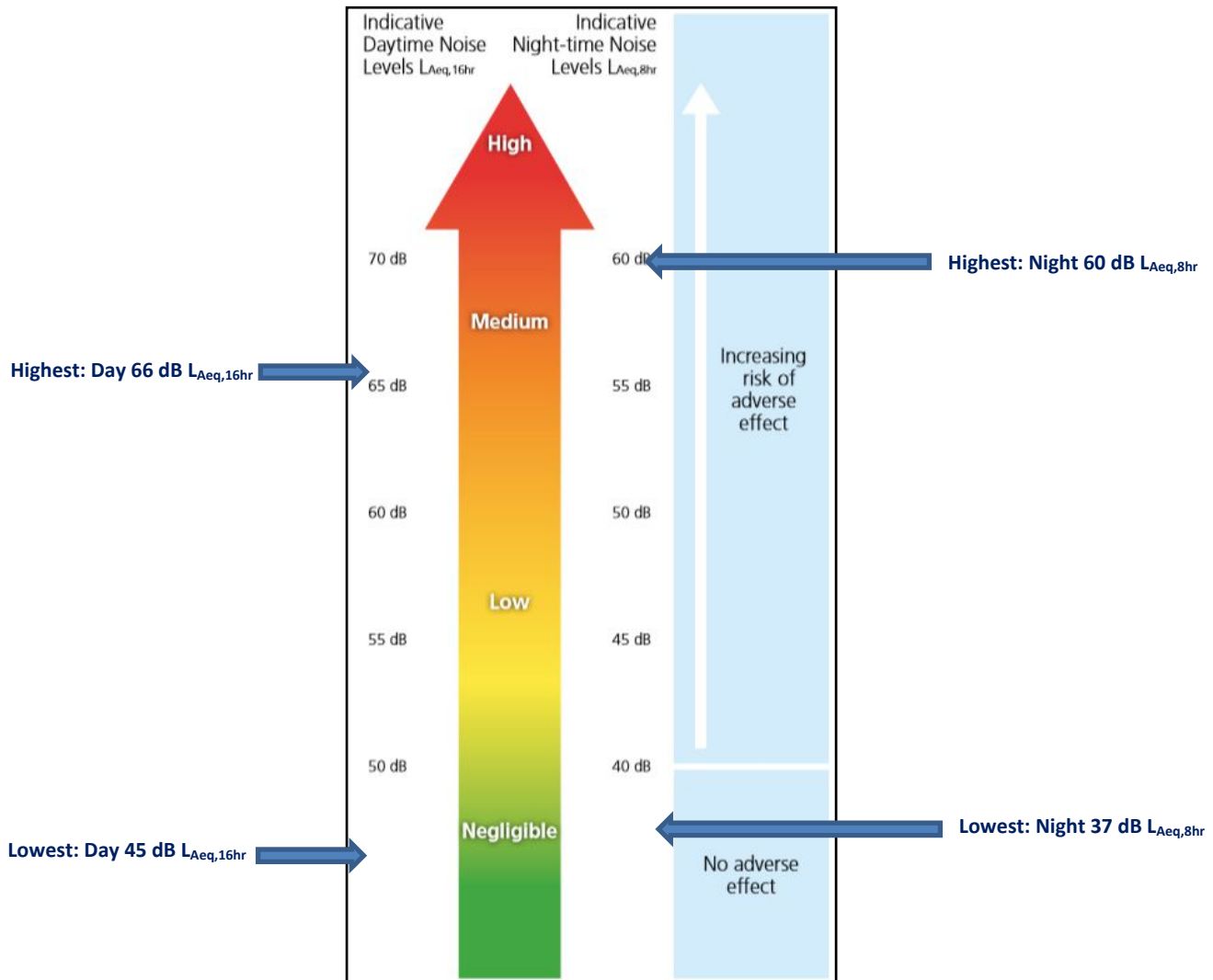
Figure 8: Site Plan indicating Communal Amenity Areas



5.1.3 ProPG Stage 1 Noise Risk Categories

Figure 9 presents the basis of the initial noise risk assessment; it provides appropriate risk categories for a range of continuous noise levels measured and/or predicted on site. The range expected noise levels (including the expected contribution from the GDRS) on the site are indicated on Figure 9.

Figure 9 ProPG Stage 1 - Noise Risk Assessment Categories (Highest expected Site Noise Levels Indicated)



ProPG also states that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night. Reference to Figure 3 confirms that 80dB L_{AFmax} was not exceeded on any occasion over the course of the night-time noise survey (23:00 – 07:00hrs), thus would not fall within the high risk category.

A Stage 1 noise risk assessment of the proposed site has been conducted, based on measured noise levels on site and expected noise levels on site in the foreseeable future, with comparison to the categories outlined in Figure 9.

With reference to the existing noise levels measured on site (as presented in Tables 4 to 8), the initial ProPG noise risk categories, for the facades most exposed to road traffic noise, are summarised as follows:

Daytime: **Negligible to Medium**
 Night-time **Negligible to Medium/High**

5.2 ProPG Stage 2 (Acoustic Design Statement)

With consideration of the Stage 1 review, as presented above, it is considered that the site is suitable for residential development, provided that an appraisal of the proposed development is carried out, 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.

5.2.1 Element 1: Good Acoustic Design (GAD) Process

Good acoustic design should aim to deliver optimum acoustic design for a site without adversely affecting amenity or quality of life or compromising other sustainable design objectives ProPG states that good acoustic design is not equivalent to overdesign of all new development but that it seeks to deliver an optimum acoustic environment for a given site. ProPG outlines the following checklist for GAD:

- Check the feasibility of relocating or reducing noise levels from relevant sources.
- Consider options for planning the site or building layout.
- Consider the orientation of proposed building(s).
- Select construction types and methods for meeting building performance requirements.
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.
- Assess the viability of alternative solutions.
- Assess external amenity area noise.

Each item listed above have been addressed in the following sections.

5.2.1.1 Relocation or Reduction of Noise from Source

The dominant noise source impacting upon the site is road traffic from existing roads and future noise from the GDRS. Given that the roads are largely located outside the site boundary, additional reduction of noise as source cannot be considered in respect of this development.

A reduction in noise emissions to the proposed site can sometimes be achieved via the provision of perimeter barrier screens. However, the height and location of the proposed development in relation to surrounding noise sources is such that the effectiveness of a noise barrier will be limited.

5.2.1.2 Planning, Layout and Orientation

Development buildings are set back from the nearby transport network in accordance with local planning guidelines. It is considered that the layout and orientation of the proposed development is sufficient in the context of noise emissions and GAD.

5.2.1.3 Select Construction Types for meeting Building Regulations

Masonry (i.e. blockwork/concrete) constructions will be used for external walls of dwellings. These constructions provide high levels of sound insulation performance.

Glazing and ventilation paths are typically the weakest façade elements in terms of sound insulation performance. The provision of glazing and ventilators offering an appropriate level of sound insulation will therefore be provided.

Calculations indicate that it will be possible to achieve the desirable internal acoustic environments when windows are open along the majority of building façades. Additional review of specific locations is provided in the following sections.

It will be necessary to provide habitable rooms with acoustically rated ventilators along the building elevations most exposed to traffic noise. Occupants will have the options to open the windows if they so wish, however, doing so will increase the internal noise level. This approach to mitigation is acknowledged in ProPG, as reproduced below:

“2.22 Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided; occupants generally prefer the ability to have control over the internal environment using openable windows, even if the acoustic conditions would be considered unsatisfactory when open. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for this approach, is not regarded as good acoustic design. Any reliance upon building envelope insulation with closed windows should be justified in supporting documents “

Note 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the “open” position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded

2.34 *Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide “whole dwelling ventilation” in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position (see Supplementary Document 2). Furthermore, in this scenario the internal L_{Aeq} target noise levels should not generally be exceeded.”*

It is therefore acceptable to provide building facades with appropriate sound insulation, with windows closed and vents open, that result in a good internal acoustic environment.

5.2.1.4 *Impact of noise control measures on fire, health and safety etc*

The proposed noise control measures do not have a significant impact on fire or other health and safety issues.

5.2.1.5 *Assess Viability of Alternative Solutions*

The major noise sources incident on the site are road traffic. Road traffic is mitigated by the distance from the road edge to the building, screening by existing/proposed structures, off and on-site buildings and orientation of windows. All the measures listed above aid in the control of noise intrusion to the living areas and bedrooms across the majority of the development.

5.2.1.6 *Assess External Amenity Area Noise*

ProPG advises the following in relation to external noise levels in amenity areas:

The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$.

An assessment of noise within external amenity areas is addressed in the relevant section of this document.

5.2.1.7 *GAD Summary*

It is considered that the principles of Good Acoustic Design have been applied to the development.

5.2.2 Element 2: Internal Noise Level Guidelines

5.2.2.1 Internal Noise Criteria

ProPG recommends internal noise targets as derived from BS 8233. These internal noise level targets are presented in Table 9.

ProPG acknowledges that there can be some flexibility given in cases where the development is necessary or desirable, and that a relaxation by up to 5dB of the internal L_{Aeq} values can still provide reasonable internal conditions.

5.2.2.2 Assessed External Noise Levels

Noise surveys and calculations have been conducted across the site in order to establish the range and magnitude of noise levels at various positions on-site. Table 11 presents the free-field noise levels used for assessment purposes.

Table 11: Projected Traffic Noise Levels at Development Facades



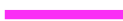

Development Zone (Ref. Figure 10)	Period	Assessment Level (dB $L_{Aeq,T}$)
Zone A (Magenta) 	Daytime (07:00 to 23:00)	61 – 66
Zone B (Orange) 		56 – 60
Zone C (All Other Dwellings)		45 – 55
Zone A (Magenta) 	Night-time (23:00 to 07:00)	56 – 60
Zone B (Orange) 		51 – 55
Zone C (All Other Dwellings)		37 – 50

Figure 10 indicates the how the noise level zones described above relate to the proposed development façades.

Figure 10: Façade Noise Level Designation



5.2.2.3 Façade Acoustic Performance Specification

The methodology to estimate internal noise level within a building is outlined in Annex G of BS 8233: 2014 and is derived from BS EN 12354-3: 2000: *Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound*. The methodology calculates internal noise levels based on a reference external noise level (i.e. octave band frequency data as measured in baseline noise surveys) and proposed façade constructions. The standard takes into account the following site-specific characteristics:

- External noise level;
- Area and type of each façade element (i.e. window, wall, etc.);
- Shape of the façade, and;
- Characteristics of the receiving room (i.e. room volume, reverberation time etc.)

This method has been used to determine the required sound insulation performance for the various building façade elements.

Glazing

Facades shall be provided with glazing that achieves the following minimum sound insulation performance.

Table 12: Glazing Acoustic Specification (Ref. Figure 10)

Specification (Ref Figure 10)	Sound Reduction Performance Requirements (dB) in Octave Frequency Bands (Hz)						Typical Overall dB R_w
	125	250	500	1k	2k	4k	
Zone A (Magenta)	27	28	36	45	53	59	41
Zone B (Orange)	25	22	33	40	43	44	36
Zone C (All Other Dwellings)	24	20	25	35	38	35	31

The overall R_w values outlined above are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values.

The acoustic performance specifications are minimum requirements which apply to the overall glazing system. The ‘glazing system’ is understood to include any and all of the component parts that form part of the glazed element of the façade, i.e. glass, frames, seals, openable elements etc.

The window supplier shall provide laboratory tests confirming the sound insulation performance, (to British Standard 2750 Part 3:1980 and British Standard 5821, or British Standard EN ISO 140 Part 3 1995 and British Standard EN ISO 717, 1997).

Wall / Roof Constructions

Masonry wall and roof constructions with plasterboard linings typically offer sound insulation performance much greater than that offered by the glazed elements.

The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 55 dB R_w for these constructions. The performance of non-glazed elements of the façade will be confirmed as part of the detailed design phase.

Acoustic Attenuation to Ventilation Systems

Acoustic attenuation to ventilation systems shall be provided to the following rooms:

Table 13: Specification for Acoustic Ventilators to Dwellings (Ref. Figure 10)

Specification (Ref Figure 10)	Room Type	Required Overall dB $D_{n,e,w}$
Zone A (Magenta)	Living Room, Dining Rooms and Bedrooms	41
Zone B (Orange)	Living Room, Dining Rooms and Bedrooms	36
Zone C (All Other)	Not Required	Not Required

The ventilation supplier shall provide evidence, consisting of calculations and/or laboratory tests confirming the acoustic performance of ventilation systems.

5.2.2.4 *Element 3: External Amenity Area Noise Assessment*

It is a ProPG requirement, as part of the acoustic design statement, to assess noise levels within external amenity spaces. ProPG refers to guidance contained in BS 8233 (2014) for this element of the assessment, the relevant extract of BS 8233 (2014) states:

“The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”

BS 8233 also comments that:

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying

washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

In addition, ProPG, Element 3(v) states the following in relation to external amenity areas:

“Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:

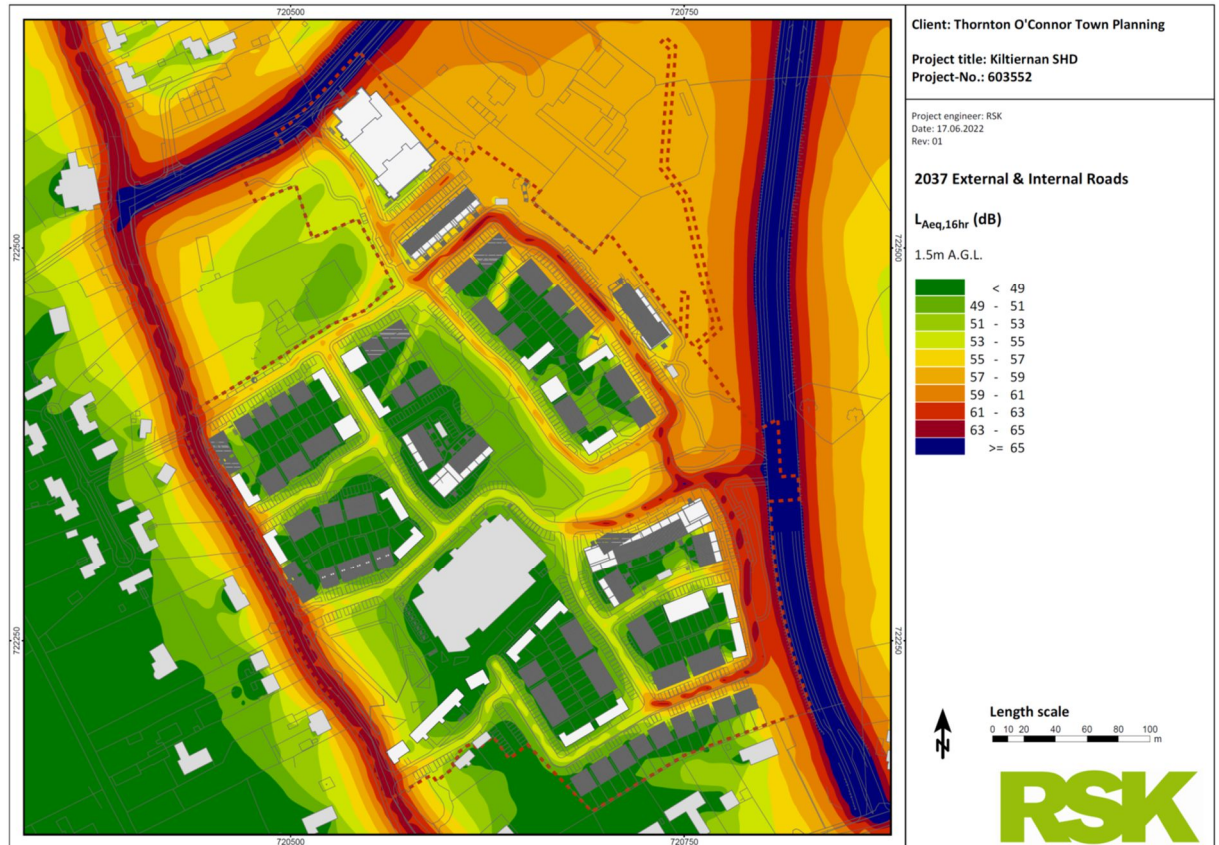
- *a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or;*
- *a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or;*
- *a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or;*
- *a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquility) that is nearby (e.g. within a 5 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.*

With consideration of the various open amenity spaces / gardens proposed as part of the development, the following comments are provided:

Proposed External Amenity Areas

There are number of public open amenity spaces proposed as part of the development, as well as private gardens to dwellings and apartment balconies, and courtyard areas. The external noise levels in these amenity areas are indicated in Figure 11.

Figure 11: Site Plan indicating Expected Noise Levels in External Amenity Areas



The majority of private amenity spaces have noise levels that achieve the recommended range of noise levels as outlined in ProPG Guidance i.e. *noise levels should ideally not be above the range 50 – 55 dB LAeq,T*. In addition, there are various public amenity spaces throughout the development, that have noise levels that achieve the recommended range. As such we consider that the intent of ProPG (Ref. Element 3(v)) has been achieved with regard to noise in external amenity areas, as all residents will have access to either:

a relatively quiet façade, a relatively quiet alternative or additional external amenity space, a nearby relatively quiet external amenity space for sole use by a limited group of residents, or, a nearby relatively quiet, protected, publically accessible, external amenity space.

5.2.2.5 Element 4: Assessment of Other Relevant Issues

ProPG defines a number of other issues that should be considered and may prove pertinent to the assessment:

- 4(i) compliance with relevant national and local policy
- 4(ii) magnitude and extent of compliance with ProPG
- 4(iii) likely occupants of the development
- 4(iv) acoustic design v unintended adverse consequences
- 4(v) acoustic design v wider planning objectives

Each of the above considerations are discussed below.

Compliance with Relevant National and Local Policy

Section 8.2.3 of the Dublin Agglomeration Environmental Noise Action Plan, December 2018 – July 2023, Volume 2, Dún Laoghaire-Rathdown County Council (NAP), along with Section 12.9.2 *Noise Pollution and Noise Nuisance* of the Dún Laoghaire-Rathdown County Development Plan 2022-2028 all refer to *Professional Planning Guidance (ProPG) on Planning & Noise: New Residential Development* in order to encourage the use of good acoustic design process in and around proposed new residential development, having regard to national policy.

This report has therefore been prepared in compliance with the requirements of national and Local policy.

Magnitude and extent of compliance with ProPG

The following conclusions are made in relation to the magnitude and extent of compliance with ProPG:

- All dwellings have been designed to achieve the good internal noise levels, as specified within ProPG, when windows are closed.
- Dwellings that are screened by the development buildings can achieve good to reasonable internal noise levels with windows partially open.
- The remainder of dwellings can achieve good internal noise levels with windows closed and acoustic ventilators open.
- There are external amenity spaces available for use by residents that have been assessed and are determined to be within the ProPG guidance for noise levels in external amenity areas.

It is therefore concluded that the proposed development is in compliance with the requirements of ProPG.

Likely occupants of the development

The development consists of apartments, duplexes and houses and is designed primarily for the purpose of residential accommodation, along with and a new neighborhood centre with retail, offices, medical, a community centre etc.

The criteria adopted as part of this assessment are based on those recommended for permanent dwellings and are therefore considered robust and appropriate for the occupants.

Acoustic design v unintended adverse consequences

There have not been any unintended adverse consequences identified resulting from the acoustic design and control measures.

Acoustic design v wider planning objectives

Acoustic design has been considered in the context of wider planning objectives, particularly the National Planning Framework 2040. (NPF) The NPF is taken into consideration in the production of local planning policy/guidelines and plans. In following existing local / national guidelines and policies, it is considered that the acoustic design is compliant with wider planning objectives.

6 PLANT NOISE EMISSIONS FROM PROPOSED DEVELOPMENT

Reference is made to BS 4142:2014+A1: 2019 in setting criteria for new mechanical plant items (i.e. such as may be required to service the retail/commercial elements of the proposed neighborhood centre). Such plant items may include extract fans, heat pumps, air conditioning units etc.

Based upon measured day and night-time background sound levels on the site, appropriate plant noise criteria to nearby dwellings (including existing and proposed new dwelling) are as follows:

- Daytime (07:00 to 23:00hrs) 45 dB $L_{Aeq,1hr}$
- Night-time (23:00 to 07:00hrs) 35 dB $L_{Aeq,15-min}$

Plant noise emissions should not contain any characteristics that would warrant any acoustic feature penalties under the BS 4142:2014 assessment procedure.

At detailed design stage, noise emissions from new plant servicing the development shall be designed so as not to exceed the above limit values.

7 CONCLUSIONS

RSK Ireland Limited (RSK) was instructed by Liscove Limited to conduct a noise impact assessment and Acoustic Design Statement (ADS) in respect of a Lands at Wayside, Kiltarnan Dublin 18.

The aim of this study is to assess the potential impacts to future residents and nearby receptors and to provide recommendations, where necessary, to the risk of nuisance arising from operational phase noise emissions.

Baseline monitoring has found pre-existing noise levels are typical of a suburban location in the vicinity of a busy road network. Future noise emissions from the Glenamuck District Roads Scheme (GDRS) have been taken into account and resultant expectant future noise levels on site established via modelling.

This report also considers the potential inward impact of road traffic on the proposed development. Assessment methodologies use guidance from *The Professional Guidance on Planning & Noise* (ProPG), May 2017. The two primary stages of the ProPG assessment are the “Stage 1” initial noise risk assessment of the proposed site and “Stage 2” detailed appraisal of the proposed development and preparation of an Acoustic Design Statement.

The site noise survey has also been used to assess the sites noise risk categories, as per the ProPG “Stage 1” assessment. The ProPG noise risk categories, for façades most exposed to road traffic, are **Negligible to Medium** for daytime and **Negligible to Medium/High** for night-time periods.

Recommendation to mitigate noise emissions, as specified in the “Stage 2” Acoustic Design Statement, include the following:

- Provision of glazing with minimum sound insulation properties as outlined in this document.
- Provision of acoustic attenuation to ventilation systems for dwellings as outlined in this document.

In the developments operational phase, criteria have also been set for new any new building services plant (i.e. such as may be required to service the retail/commercial elements of the proposed neighbourhood centre), to both existing and future residents, in accordance with the methodologies outlined in BS 4142:2014+A1:2019. It has been concluded that the likely noise impact of the developments in its operational phase is not significant.

In summary, it is considered that the site is suitable for residential development subject to the provision of the noise control recommendations as outlined in this report.

APPENDIX A


SERVICE CONSTRAINTS

RSK ENVIRONMENT LIMITED SERVICE CONSTRAINTS



1. This report (the "Services") was compiled and carried out by RSK Ireland Limited (RSK) for Liscove Limited . (the "client") in accordance with the terms of a contract between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be** well advised to seek independent advice from a competent environmental consultant and/or lawyer.
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date hereof, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.
8. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.

APPENDIX B

CALIBRATION CERTIFICATES



CERTIFICATE OF CALIBRATION

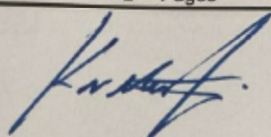
0653

Date of Issue: 15 September 2021

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Certificate Number: UCRT21/2129

Page 1 of 2 Pages

Approved Signatory


K. Mistry

Customer	RSK Ireland Ltd Bluebell Business Centre Old Naas Road Bluebell Dublin 12		
Order No.	Arron Hamilton		
Description Identification	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator		
	<i>Manufacturer</i>	<i>Instrument</i>	<i>Type</i>
	Rion	Sound Level Meter	NL-52
	Rion	Firmware	2.0
	Rion	Pre Amplifier	NH-25
	Rion	Microphone	UC-59
	Rion	Calibrator	NC-75
		Calibrator adaptor type if applicable	NC-75-022
Performance Class	1		
Test Procedure	TP 10. SLM 61672-3:2013 <i>Procedures from IEC 61672-3:2013 were used to perform the periodic tests.</i>		
Type Approved to IEC 61672-1:2013	Yes <i>If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013</i>		
Date Received	14 September 2021	ANV Job No.	UKAS21/09610
Date Calibrated	15 September 2021		

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate	Dated	Certificate No.	Laboratory
	Initial Calibration		

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.

CERTIFICATE OF CALIBRATION		Certificate Number UCRT21/2129	
UKAS Accredited Calibration Laboratory No. 0653		Page 2 of 2 Pages	
Sound Level Meter instruction manual and data used to adjust the sound levels indicated.			
SLM instruction manual title	NL-62/NL-42 Description for IEC 61672-1		
SLM instruction manual ref / issue	No. 56034 21-03	Source	Rion
Date provided or internet download date	19 March 2021		
	Case Corrections	Wind Shield Corrections	Mic Pressure to Free Field Corrections
Uncertainties provided	Yes	Yes	Yes
Total expanded uncertainties within the requirements of IEC 61672-1:2013			YES
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Customers Calibrator		
Calibrator adaptor type if applicable	NC-75-022		
Calibrator cal. date	15 September 2021		
Calibrator cert. number	UCRT21/2127		
Calibrator cal cert issued by Lab	0653		
Calibrator SPL @ STP	93.98	dB	Calibration reference sound pressure level
Calibrator frequency	1000.00	Hz	Calibration check frequency
Reference level range	Single dB		
Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15			
Note - The Extension Cable was used between the SLM and the pre-amp for this calibration.			
Environmental conditions during tests		Start	End
	Temperature	22.95	22.67
	Humidity	43.8	43.5
	Ambient Pressure	100.44	100.44
			± 0.30 °C
			± 3.00 %RH
			± 0.03 kPa
Indication at the Calibration Check Frequency			
Initial indicated level	93.9	dB	Adjusted indicated level
			94.0
			dB
Uncertainty of calibrator used for Indication at the Calibration Check Frequency ±			
			0.10
			dB
Self Generated Noise			
Microphone installed -	Less Than	17.1	dB A Weighting
Microphone replaced with electrical input device - UR = Under Range indicated			
Weighting	A	C	Z
	11.8	16.2	22.9
	dB	dB	dB
	UR	UR	UR
Self Generated Noise reported for information only and not used to assess conformance to a requirement			
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.			
<u>Additional Comments</u> The results on this certificate only relate to the items calibrated as identified above.			
None			
END			
Calibrated by: B. Bogdan		R 2	

Calibration Certificate

Certificate Number 2020010546

Customer:

Environmental Measurement

Unit 12 Tallaght Business Centre

Whitestown Business Park

Dublin, 24, Ireland

Model Number	LxT SE	Procedure Number	D0001.8378
Serial Number	0006263	Technician	Ron Harris
Test Results	Pass	Calibration Date	21 Sep 2020
Initial Condition	As Manufactured	Calibration Due	
Description	Sound Expert LxT Class 1 Sound Level Meter Firmware Revision: 2.404	Temperature	23.44 °C ± 0.25 °C
		Humidity	51.4 %RH ± 2.0 %RH
		Static Pressure	86.48 kPa ± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRMLxT1L S/N 070000 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 23.6 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2001 Class 1	ANSI S1.11 (R2009) Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017. Test points marked with a † in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis LxT Manual for SoundTrack LxT & SoundExpert LxT, I770.01 Rev O Supporting Firmware Version 4.0.5, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa

LARSON DAVIS - A PCB PIEZOTRONICS DIV.


681 West 820 North
Provo, UT 84601, United States
16-684-0001





020-9-21711.17.12

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D0001.8407 Rev E



**CERTIFICATE
OF
CALIBRATION**

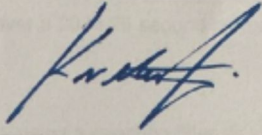
0653

Date of Issue: 15 September 2021 **Certificate Number: UCRT21/2127**

Calibrated at & Certificate issued by:
 ANV Measurement Systems
 Beaufort Court
 17 Roebuck Way
 Milton Keynes MK5 8HL
 Telephone 01908 642846 Fax 01908 642814
 E-Mail: info@noise-and-vibration.co.uk
 Web: www.noise-and-vibration.co.uk

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Approved Signatory



K. Mistry

Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Customer	RSK Ireland Ltd Bluebell Business Centre Old Naas Road Bluebell Dublin 12			
Order No.	Arron Hamilton			
Test Procedure	Procedure TP 14 Calibration of Sound Calibrators (60942:2017)			
Description	Acoustic Calibrator			
Identification	<i>Manufacturer</i> Rion	<i>Instrument</i> Calibrator	<i>Model</i> NC-75	<i>Serial No.</i> 34613228
	Public evidence of Type Approval	Yes	Approved by PTB	

The calibrator has been tested as specified in Annex B of IEC 60942:2017. 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 IEC 60942:2017, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2017.

ANV Job No.	UKAS21/09610		
Date Received	14 September 2021		
Date Calibrated	15 September 2021		
Previous Certificate	<i>Dated</i>	Initial Calibration	
	<i>Certificate No.</i>		
	<i>Laboratory</i>		

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.

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653

Certificate Number

UCRT21/2127

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Measurements

The sound pressure level generated by the calibrator (averaged over a 20 to 25 second period) in its WS2 configuration was measured five times (rotating the calibrator on the microphone each time) by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below.

The frequency of the sound from the calibrator was measured five times over a 20 to 25 second period and the average frequency calculated.

The total distortion + noise of the sound from the calibrator was measured, using a rejection filter distortion factor meter, five times over a 20 to 25 second period and the average distortion + noise calculated.

Test Microphone	Manufacturer	Type
	Brüel & Kjær	4134

<u>Nominal Setting</u> dB / Hz	<u>Mean Level</u> dB rel 20 µPa	<u>Frequency</u>	<u>Distortion + Noise</u>
94 / 1000	93.98 ± 0.10	1000.00 Hz ± 0.02%	(0.16 ± 0.02) %

<u>Environmental conditions during tests</u>	<u>Start</u>	<u>End</u>	
Temperature	23.37	23.36	± 0.30 °C
Humidity	45.7	44.2	± 3.0 %RH
Ambient Pressure	100.441	100.449	± 0.030 kPa

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.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

Note: Calibrator adjusted prior to calibration? NO

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

Calibrated by: B. Bogdan

R 2

END

APPENDIX C

RAW NOISE MONITORING DATA

Raw Data from Baseline Noise Survey

Date	Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
2022-05-13	15:07:45	62.5	83.9	64.6	54.3
2022-05-13	15:15:00	61.7	73.0	65.7	49.7
2022-05-13	15:30:00	61.9	76.0	65.9	51.4
2022-05-13	15:45:00	61.3	74.9	65.1	50.0
2022-05-13	16:00:00	62.1	74.5	66.2	49.7
2022-05-13	16:15:00	62.1	75.9	66.0	51.2
2022-05-13	16:30:00	63.1	75.1	67.0	53.5
2022-05-13	16:45:00	63.0	78.2	66.8	52.4
2022-05-13	17:00:00	61.9	74.9	66.0	50.2
2022-05-13	17:15:00	61.5	75.5	65.7	45.0
2022-05-13	17:30:00	61.8	73.8	65.9	49.6
2022-05-13	17:45:00	61.9	76.2	65.8	50.7
2022-05-13	18:00:00	61.7	74.2	65.8	48.9
2022-05-13	18:15:00	61.4	74.9	65.7	48.2
2022-05-13	18:30:00	61.3	76.0	65.4	46.9
2022-05-13	18:45:00	61.2	75.9	65.3	46.6
2022-05-13	19:00:00	60.4	73.9	64.5	45.4
2022-05-13	19:15:00	60.9	76.3	64.7	46.4
2022-05-13	19:30:00	60.2	74.9	64.2	47.0
2022-05-13	19:45:00	59.5	72.9	63.5	43.7
2022-05-13	20:00:00	59.1	74.9	63.1	42.8
2022-05-13	20:15:00	59.8	79.1	63.8	43.7
2022-05-13	20:30:00	60.7	80.0	64.4	44.1
2022-05-13	20:45:00	59.5	75.6	63.4	42.8
2022-05-13	21:00:00	58.2	76.6	62.3	39.3
2022-05-13	21:15:00	58.8	75.7	62.6	40.8
2022-05-13	21:30:00	59.1	76.3	62.9	39.2
2022-05-13	21:45:00	58.1	73.4	61.9	39.6
2022-05-13	22:00:00	55.6	75.7	59.4	34.4

Date	Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
2022-05-13	22:15:00	55.0	72.3	58.6	34.0
2022-05-13	22:30:00	56.4	74.6	59.9	36.2
2022-05-13	22:45:00	56.8	74.5	60.2	36.7
2022-05-13	23:00:00	55.9	74.4	59.1	36.1
2022-05-13	23:15:00	56.2	74.5	59.7	37.7
2022-05-13	23:30:00	53.0	74.5	55.7	35.5
2022-05-13	23:45:00	49.8	72.0	49.2	38.3
2022-05-14	00:00:00	54.8	73.0	57.9	40.1
2022-05-14	00:15:00	53.0	72.6	55.8	38.3
2022-05-14	00:30:00	51.3	72.9	52.9	32.2
2022-05-14	00:45:00	50.0	75.8	51.0	29.9
2022-05-14	01:00:00	50.4	76.8	45.3	28.5
2022-05-14	01:15:00	47.4	70.9	45.2	26.9
2022-05-14	01:30:00	52.9	71.4	55.5	27.4
2022-05-14	01:45:00	48.4	75.6	41.0	24.6
2022-05-14	02:00:00	49.2	72.7	49.0	26.4
2022-05-14	02:15:00	40.9	68.9	31.9	25.8
2022-05-14	02:30:00	50.6	71.3	52.5	25.3
2022-05-14	02:45:00	42.2	68.7	29.8	23.6
2022-05-14	03:00:00	46.5	71.6	34.6	24.3
2022-05-14	03:15:00	47.6	70.6	41.0	24.4
2022-05-14	03:30:00	51.6	75.5	51.6	25.6
2022-05-14	03:45:00	48.5	71.7	48.4	22.6
2022-05-14	04:00:00	48.1	73.4	42.0	22.8
2022-05-14	04:15:00	46.1	70.3	44.7	26.9
2022-05-14	04:30:00	47.8	71.8	47.1	35.8
2022-05-14	04:45:00	49.4	76.6	47.9	36.7
2022-05-14	05:00:00	51.5	72.9	51.1	33.4
2022-05-14	05:15:00	48.8	75.3	43.9	34.0
2022-05-14	05:30:00	48.7	71.1	48.8	34.5
2022-05-14	05:45:00	52.9	75.8	54.8	35.1
2022-05-14	06:00:00	52.1	76.2	53.9	35.3
2022-05-14	06:15:00	50.6	72.9	51.9	35.7
2022-05-14	06:30:00	53.5	76.7	54.7	34.3

Date	Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
2022-05-14	06:45:00	55.4	76.7	57.3	34.8
2022-05-14	07:00:00	54.0	73.0	56.3	34.8
2022-05-14	07:15:00	56.6	75.9	59.3	36.7
2022-05-14	07:30:00	56.0	74.4	58.6	35.1
2022-05-14	07:45:00	56.4	72.5	59.7	35.6
2022-05-14	08:00:00	57.0	75.1	59.8	35.4
2022-05-14	08:15:00	56.9	73.4	60.1	36.0
2022-05-14	08:30:00	58.1	73.5	61.4	39.4
2022-05-14	08:45:00	59.5	77.8	63.6	42.9
2022-05-14	09:00:00	58.3	73.6	62.0	41.4
2022-05-14	09:15:00	60.1	78.7	63.9	43.1
2022-05-14	09:30:00	60.0	74.1	64.5	42.3
2022-05-14	09:45:00	59.9	84.2	64.2	43.0
2022-05-14	10:00:00	60.2	73.7	64.7	44.6
2022-05-14	10:15:00	59.2	72.7	63.5	46.7
2022-05-14	10:30:00	59.5	73.8	63.6	47.8
2022-05-14	10:45:00	59.8	79.6	63.8	46.5
2022-05-14	11:00:00	60.6	85.6	63.8	47.3
2022-05-14	11:15:00	59.6	73.7	63.7	48.4
2022-05-14	11:30:00	59.8	73.4	64.1	47.2
2022-05-14	11:45:00	60.3	74.1	64.3	49.3
2022-05-14	12:00:00	59.4	75.0	63.8	46.9
2022-05-14	12:15:00	60.4	74.0	64.7	49.2
2022-05-14	12:30:00	60.2	72.2	64.6	46.5
2022-05-14	12:45:00	60.1	72.9	64.6	48.1
2022-05-14	13:00:00	59.6	75.6	64.1	46.2
2022-05-14	13:15:00	60.0	74.7	64.3	47.5
2022-05-14	13:30:00	60.1	73.5	64.6	47.4
2022-05-14	13:45:00	59.8	73.6	64.3	46.0
2022-05-14	14:00:00	59.3	73.2	63.8	43.6
2022-05-14	14:15:00	64.0	95.6	64.9	45.0
2022-05-14	14:30:00	60.0	73.2	64.7	45.1

Date	Time	Measured Noise Levels (dB re. 2×10^{-5} Pa)			
		L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
2022-05-14	14:45:00	59.2	73.4	64.0	42.5
2022-05-14	15:00:00	60.8	87.0	63.7	44.2
2022-05-14	15:15:00	58.0	79.0	62.3	5.6