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TECHNICAL REPORT

NOISE IMPACT ASSESSMENT FOR PROPOSED STRATEGIC HOUSING DEVELOPMENT AT BALLYMANY NEWBRIDGE Co KILDARE

For
Briargate Developments Newbridge Ltd.
Newbridge. Co.
Kildare.

Report prepared by: **Noel Tynan**, Acoustic Consultant

Our reference: dB1577.
Date: 1st Feb. 2022.

NON TECHNICAL SUMMARY

Decibel Noise Control was commissioned to perform a noise impact assessment for a proposed strategic housing development at Ballymany, Newbridge, Co. Kildare. The assessment was to address the noise from the surrounding area intruding on the proposed development and to ensure that the development will not be exposed to noise levels in excess of the Kildare County Council Noise Action Plan, BS8233: 2014 – *Guidance on sound insulation and noise reduction for buildings* and World Health Organisation (WHO) recommendations.

The noise assessment has been prepared in general accordance with "Professional Practice Guidance on Planning & Noise: New Residential Developments" (2017) (ProPG)

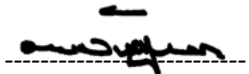
The assessment concludes that with the specified double glazing in place predicted internal noise levels in the proposed dwellings will be in keeping with BS8233: 2014 – *Guidance on sound insulation and noise reduction for buildings* and World Health Organisation (WHO) recommendations and guidance.

A correction has been made in the noise assessment to allow for reduced traffic flow resulting from Covid 19 Level 5 restrictions.

In accordance with the ProPG assessment the noise survey results indicate that the site may be regarded as a low risk area and good acoustic design demonstrated so that any adverse noise impact will be avoided in the finished development.

To this end double glazing with natural ventilation are recommended to ensure internal noise levels within the dwellings will comply with BS8233: 2014 and WHO guidelines.

The five public open spaces included in the development are within acceptable limits with reference to Kildare County Council Noise Action Plan 2019-2023, British Standard BS8233:2014 & *ProPG guidelines.*



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CONTENTS

1.0 INTRODUCTION

2.0 DESCRIPTION OF DEVELOPMENT.

3.0 NOISE SURVEY.

4.0 MEASURING LOCATIONS:

5.0 SURVEY PROCEDURE:

6.0 SURVEY RESULTS

7.0 FINDINGS.

8.0 NOISE GUIDANCE

9.0 INITIAL SITE NOISE RISK ASSESSMENT.

10.0 DEVELOPMENT SITE LAYOUT.

11.0 NOISE CRITERIA:

12.0 EXTERNAL NOISE LEVEL:

13.0 INTERNAL NOISE LEVELS

14.0 OPEN WINDOWS

15.0 DESIGN CRITERIA FOR EXTERNAL NOISE.

16.0 CONSTRUCTION PHASE:

17.0 CONCLUSION.

18.0 TERMINOLOGY.

1.0 INTRODUCTION

Decibel Noise Control has been commissioned to perform a noise impact assessment for a strategic housing development (SHD) at Ballymany, Newbridge, Co Kildare.

2.0 DESCRIPTION OF DEVELOPMENT.

The proposed residential development with creche, served by a Link Road will consist of the following:-

- Construction of 336 no. residential units consisting of 245 no. houses, 27 no. apartments and 64 no. duplexes;
- The 245 no. houses will comprise 2-storey, detached, semi-detached and terraced units to include:- ○ 17 no. 2-bed houses; ○ 184 no. 3-bed houses; ○ 44 no. 4-bed houses;
- The 27 no. apartments are located in a part 3-storey and part 4-storey building and include:- ○ 13 no. 1-bed units; ○ 13 no. 2-bed units; ○ 1 no. 3-bed unit;
- The 64 no. duplexes are located across 6 no. 2 to 3-storey buildings and include:-
- 32 no. 1-bed units; ○ 16 no. 2-bed units; ○ 16 no. 3-bed units;
- A two-storey creche;
- Car parking, bicycle parking, internal roads, services infrastructure, bin stores and bicycle stores;
- Footpath improvements along Standhouse Road;
- Landscaping, play areas, boundary treatment and public lighting;
- All associated site works and services.

3.0 NOISE SURVEY.

To establish the noise climate at the proposed development a noise survey was conducted the details of which are as follows.

Times of noise survey: Wednesday April 7th 2021 at 18:00 to Sunday April 11th 2021 at 16:55

Instrumentation at $L_{1\ South}$: Sound Level Meter, Bruel & Kjaer Type: 2250L Serial No 3001350
Microphone, Bruel & Kjaer Type: 4189 Serial No 3022867.
Calibration Certificate CDK 1908347*dated 24/10/2019.*
Bruel & Kjaer outdoor microphone kit, type UA1404.
Bruel & Kjaer Type AO 0409 Microphone extension cable.

Instrumentation at $L_{2\ North}$: Sound Level Meter, Bruel & Kjaer Type: 2270 Serial No 3001952.
Microphone, Bruel & Kjaer Type: 4189Serial No 2819925.
Calibration Certificate CDK 1937379 *dated 09/08/2019. Calibrator,*
Bruel & Kjaer Type: 4231 Serial No 2460008.
Calibration certificate No 04823/1 dated 26/10/2020.
Bruel & Kjaer outdoor microphone kit, type UA1404.
Bruel & Kjaer Type AO 0409 Microphone extension cable.

Field Calibration: Using the Type 4231 Sound Level Calibrator, that produces a sound level of 93.8dB re. $2x10^{-5}$ Pa, at a frequency of 1k Hz, both instruments used were calibrated before and after use to an accuracy of ± 0.3dB.

Using a 3m high tripod the noise survey was conducted generally in accordance with ISO 19962:2007, Acoustics — Description, measurement and assessment of environmental noise — Part 2: Determination of environmental noise levels.

4.0 Measuring Locations:

Two site locations were chosen for noise measurement, namely Location $L_{1\ South}$ & $L_{2\ North.}$ The latter being a short term synchronised measurement with the instrument located at $L_{1\ south.}$ The object of the synchronised measurement being to identify any noise decay over the site whilst moving away from the identified primary noise source the M7 motorway. Locations $L_{1\ South}$ & $L_{2\ North}$ are shown on the site map Fig (1) as follows.

Fig (1) *Noise measuring locations.* $L_{1\ South}$ & $L_{2\ North}$

5.0 Survey Procedure:

The instruments were set to measure and store noise samples of 5 minute duration and the stored samples transformed later to one hour as appropriate. Using tripods both instrument microphones were positioned some 3m above ground.

6.0 Survey Results: The survey results at Location L_1 are presented in tabulated form in Tables (1) to (4) as follows and L_{den}, $L_{Aeq\ 16hr\ \&\ 8hr}$, L_{A10}, L_{A90}, L_{AFMax} values are reported.

Results April 7th/8th 2021.				
Start Time	Noise Descriptors.			
	L_{Aeq}	L_{AF90}	L_{AF10}	L_{AFmax}
23:00	47	43	50	56
00:00	46	41	49	60
01:00	48	42	51	62
02:00	48	41	52	58
03:00	49	42	52	62
04:00	50	45	53	62
05:00	55	52	57	64
06:00	59	57	60	68
07:00	60	58	61	68
08:00	58	56	60	65
09:00	56	54	57	71
10:00	56	54	58	74
11:00	56	54	58	69
12:00	56	54	58	71
13:00	57	54	59	76
14:00	57	54	58	74
15:00	56	53	57	72
16:00	58	55	59	72
17:00	71	50	57	74
18:00	53	50	53	77
19:00	50	47	52	60
20:00	49	47	51	58
21:00	48	45	50	60
22:00	47	43	49	63
23:00	45	40	47	58
L_{den}	**61dB**			
L_{night}	**53dB** (23:00 to 07:00)			
$L_{Aeq\ 8hr.}$	**50dB** (23:00 to 07:00)			
$L_{Aeq\ 16hr.}$	**55 dB** (07:00 to 23:00)			

Table (1) *Noise Survey Results.*

Results April 8th/ 9th 2021.				
Start Time	Noise Descriptors.			
	L_{Aeq}	L_{AF90}	L_{AF10}	L_{AFmax}
23:00	45	40	47	58
00:00	42	29	46	63
01:00	31	28	32	49
02:00	36	29	40	49
03:00	39	33	42	50
04:00	43	38	45	53
05:00	46	43	48	55
06:00	48	46	49	60
07:00	49	46	50	68
08:00	48	41	47	69
09:00	56	37	61	78
10:00	49	37	51	76
11:00	54	43	54	78
12:00	63	45	60	97
13:00	56	46	61	74
14:00	60	47	63	76
15:00	66	53	66	92
16:00	52	48	54	67
17:00	51	49	52	63
18:00	50	48	52	63
19:00	49	46	51	57
20:00	48	45	50	57
21:00	45	42	48	55
22:00	43	39	46	58
23:00	42	37	44	60
L_{den}	**56 dB**			
L_{night}	**43dB** (23:00 to 07:00)			
$L_{Aeq\ 8hr.}$	**41** (23:00 to 07:00)			
$L_{Aeq\ 16hr.}$	**52** (07:00 to 23:00)			

Table (2) *Noise Survey Results.*

Results April 9th/10th 2021.				
Start Time	Noise Descriptors.			
	L_{Aeq}	L_{AF90}	L_{AF10}	L_{AFmax}
23:00	42	37	44	60
00:00	41	34	44	59
01:00	39	33	42	52
02:00	37	31	40	52
03:00	38	32	41	53
04:00	40	33	42	55
05:00	43	36	46	69
06:00	44	39	47	61
07:00	44	40	47	65
08:00	46	41	46	76
09:00	44	40	46	63
10:00	44	40	46	63
11:00	44	41	46	60
12:00	44	41	46	62
13:00	44	41	46	63
14:00	43	40	45	67
15:00	46	41	48	63
16:00	46	41	48	63
17:00	49	46	50	66
18:00	46	42	48	61
19:00	44	40	46	56
20:00	43	39	46	59
21:00	44	39	46	56
22:00	43	38	46	59
23:00	41	37	44	54
L_{den}	**49 dB**			
L_{night}	**41dB (**23:00 to 07:00)			
$L_{Aeq\ 8hr.}$	**40 dB** (23:00 to 07:00)			
$L_{Aeq\ 16hr.}$	**44(dB (**07:00 to 23:00)			

Table (3) *Noise Survey Result*

Results April 10th/11th 2021.				
Start Time	Noise Descriptors.			
	L_{Aeq}	L_{AF90}	L_{AF10}	L_{AFmax}
23:00	41	37	44	54
00:00	39	34	42	55
01:00	37	32	40	49
02:00	37	32	39	56
03:00	38	33	40	50
04:00	41	36	44	64
05:00	42	39	45	59
06:00	43	39	45	59
07:00	42	39	45	61
08:00	42	38	44	62
09:00	43	39	45	66
10:00	44	41	47	67
11:00	46	41	46	79
12:00	45	41	46	66
13:00	46	43	48	72
14:00	45	42	47	64
15:00	47	44	49	59
16:00	49	46	50	66
17:00	46	42	48	61
18:00	44	40	46	56
19:00	43	39	46	59
20:00	44	39	46	56
21:00	43	38	46	59
22:00	41	37	44	54
23:00	41	37	44	54
L_{den}	**48 dB**			
L_{night}	**40dB (**23:00 to 07:00)			
$L_{Aeq\ 8hr.}$	**39 dB** (23:00 to 07:00)			
$L_{Aeq\ 16hr.}$	**44(dB (**07:00 to 23:00)			

Table (4) *Noise Survey Result*

We summarise the measured survey results at Location L_1 as follows.

Start Time.	Descriptor	April 7th / 8th	April 8th / 9th	April 9th / 10th	April 10th / 11th
Over 24 hours.	L_{den}	*61dB*	*56 dB*	49 *dB*	48 *dB*
23:00 to 07:00	L_{night}	*53 dB*	*43 dB*	41 *dB*	40 *dB*
23:00 to 07:00	$L_{Aeq\ 8hr.}$	*50 dB*	*41 dB*	*40 dB*	*39 dB*
07:00 to 23:00	$L_{Aeq\ 16hr.}$	*55 dB*	*52 dB*	*44 dB*	*44 dB*

Table (5) Summary of Noise Survey Results at Location L_1.

As stated earlier in the report we conducted a second noise measurement at Location L_2 whilst measuring at Location L_1 and set out the results in Table (6) below.

L_{Aeq} noise levels across the site.						
Start Time	**L_1 L_{Aeq}**	**L_2 L_{Aeq}**	**L_1 L_{AF90}**	**L_2 L_{AF90}**	**L_1 L_{AF10}**	**L_2 L_{AF10}**
18:10	54	50	52	49	55	52
18:15	54	51	52	49	56	52
18:20	55	52	53	51	56	53
18:25	54	51	53	49	56	52
18:30	53	50	52	49	55	51
18:35	53	49	51	47	54	51
18:40	50	46	49	45	52	48
18:45	51	48	49	44	53	50
18:50	51	48	50	46	53	49
18:55	52	48	50	47	53	50
19:00	52	48	50	46	53	49
19:05	53	48	50	46	54	50
19:10	51	47	50	46	53	49
19:15	51	47	50	45	53	48
19:20	51	49	49	45	53	49

Table (6) *Comparing Noise at Location $L_{1\ South}$ & $L_{2\ North}$*

7.0 Findings :

Observations during the survey indicate that noise on the site was in the main dictated by road traffic noise from the M7 motorway. Location L_1 is some 300m distance from Location L_2 and Location L_1 is circa 600m from the nearside carriageway of the M7 motorway. Typically noise at Location L_2 is 3/4dB(A) less than that at Location L_1. This would indicate that with noise decaying as one moves north across the site that the main noise source is to the south, which agrees with our observations that noise on the site during the noise survey was due to M7 road traffic. It must be recognised that noise measurements were conducted during Level 5 Corvid 19 restrictions when road traffic would be considerably reduced. A continuous seven day traffic count was taken by *Muir Associates* , Consulting Engineers, outside the site on the R445 between April 13th & 19th 2021 and the Average Daily two-way flow found to be 11,200. Previous traffic counts undertaken in 2015 indicated AADT values of 13,000. Indicating a 14% reduction in traffic flow during the survey period. The highest value of noise measured during the survey occurred on Thursday April 8th when measured levels were found to be $61dBL_{den,}$ $53dBL_{night,}$ $50dBL_{Aeq\ 8hr.}$ & $55dBL_{Aeq\ 16hr.}$ Accordingly we would add 1dB to the measured values to reflect the inevitable increase in road traffic that will occur when Level 5 restrictions are lifted. Whilst 1dB might appear to be a slight correction bear in mind that 3dB is a doubling of noise and traffic flow and as a logarithmic value 1dB represents a 26% increase in road traffic flow and associated noise. Accordingly for the purposes of the assessment we would add +1dB to the values shown in Table (5) above.

8.0 Noise Guidance

The Kildare County Council Noise Action Plan (NAP) has been prepared pursuant to the European Communities Environmental Noise Regulations 2018, S.I. No. 549 / 2018 in place of the revoked Environmental Noise Regulations 2006, S.I. No. 140 / 2006. These Regulations give effect to the EU Directive 2002/49/EC relating to the assessment and management of environmental noise.

The NAP states that in order to give effect to National Policy Objective 65 of the *National Planning Framework 2040*, that the following strategic approach will be adopted by the Council: *"Ensuring that appropriate noise assessments are carried out in respect of planning applications for residential and other noise sensitive developments and the principles of good acoustic design are applied, in line with "Professional Practice Guidance on Planning & Noise: New Residential Developments" (2017) (ProPG) and that predicted internal and external noise levels are in keeping with World Health Organisation recommendations and guidance."* In addition, the following is provided

"All new applications for residential developments will be assessed in accordance with this policy and where there is the likelihood of an adverse noise impact that planning applications should be supplemented by an Acoustic Design Statement carried out by appropriately qualified acousticians and competent persons. The Acoustic Design Statement should demonstrate that all facets of the "Professional Practice Guidance on Planning & Noise" have been followed". In accordance with this NAP policy, a detailed Acoustic Design Statement (ADS) will be prepared to comply with the requirements of this policy.

The *Professional Guidance on Planning & Noise* (ProPG) document was published in May 2017. The document 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). Although not a government document, since it's adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

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

A key component of the evaluation process is the preparation and delivery of an Acoustic Design Statement (ADS) which is intended for submission to the planning authority. This document is intended to clearly outline the methodology and findings of the Stage 1 and Stage 2 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 of the ADS:

A. Planning consent may be granted without any need for noise conditions;

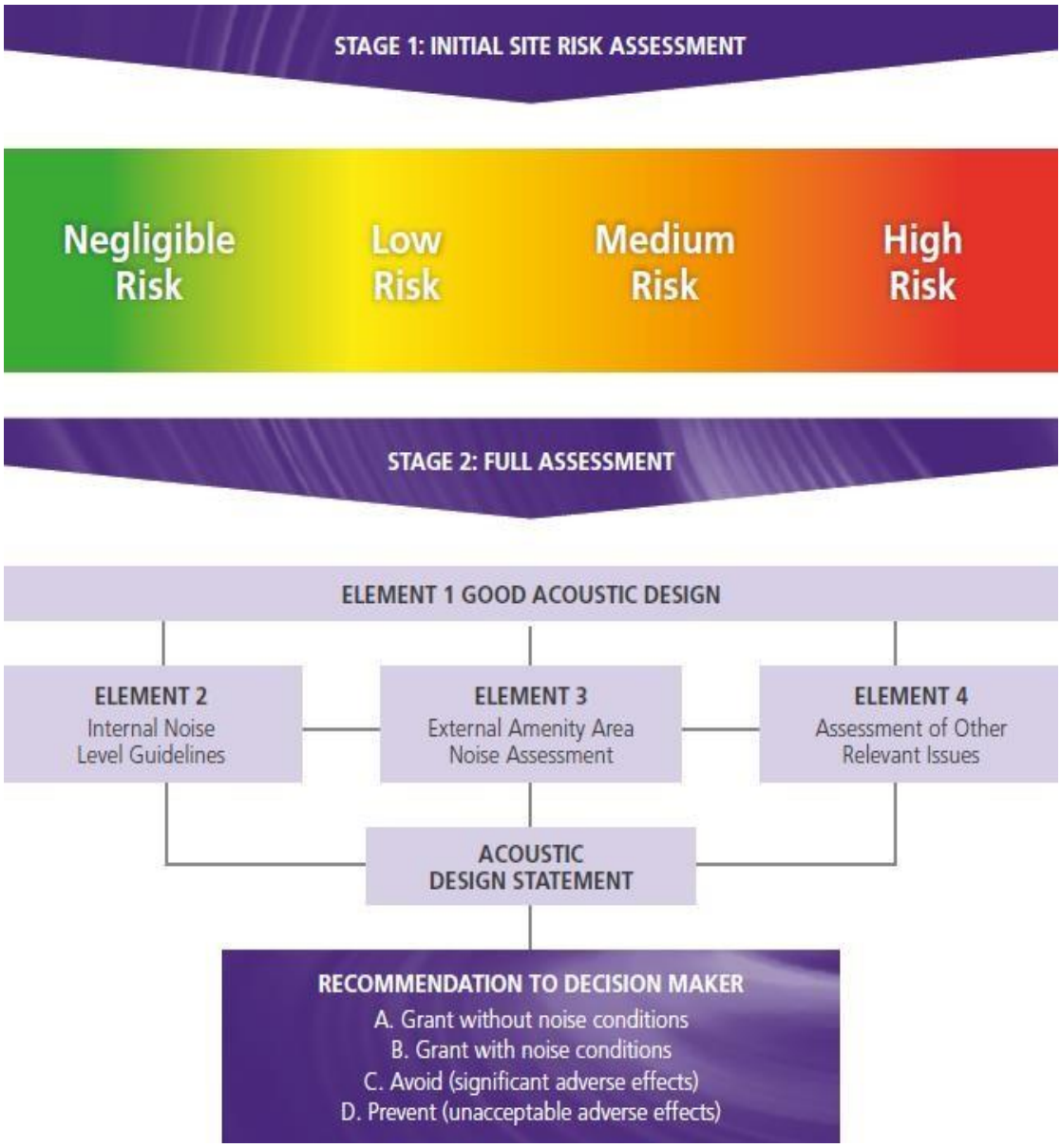
B. Planning consent may be granted subject to the inclusion of suitable noise conditions;

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").

Section 3.0 of the ProPG provides a more detailed guide on decision making to aid local authority planners on how to interpret the findings of an accompanying Acoustic Design Statement (ADS).

A summary of the ProPG approach is illustrated in the figure below.


STAGE 1: INITIAL SITE RISK ASSESSMENT
Negligible Risk
Low Risk
Medium Risk
High Risk
STAGE 2: FULL ASSESSMENT
ELEMENT 1 GOOD ACOUSTIC DESIGN
ELEMENT 2
Internal Noise Level Guidelines
ELEMENT 3
External Amenity Area Noise Assessment
ELEMENT 4
Assessment of Other Relevant Issues
ACOUSTIC DESIGN STATEMENT
RECOMMENDATION TO DECISION MAKER
A. Grant without noise conditions
B. Grant with noise conditions
C. Avoid (significant adverse effects)
D. Prevent (unacceptable adverse effects)

9.0 Initial Site Noise Risk Assessment.

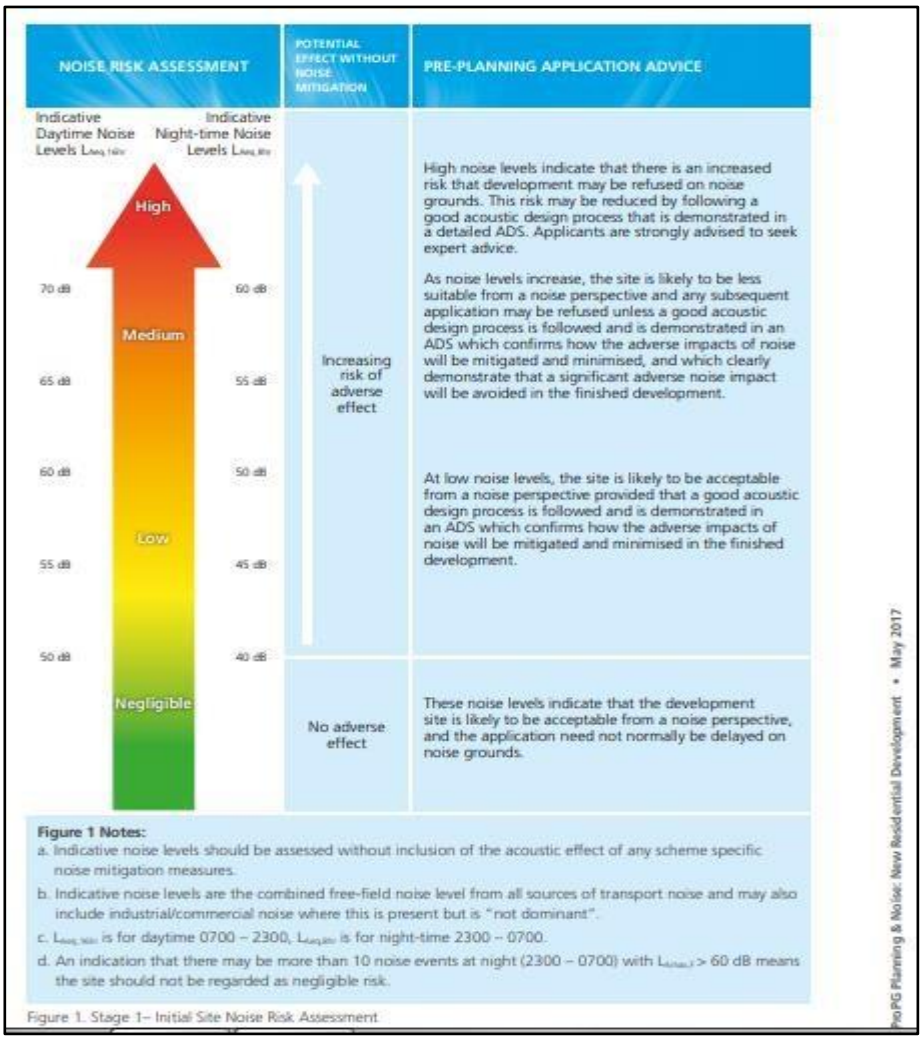


Figure 1. Stage 1– Initial Site Noise Risk Assessment

Considering the noise survey results as presented in Table (5) page (9) above we summarise the results in terms of the noise descriptors given in *ProPG* , namely the 16 hour $L_{Aeq16hr}$ for day (07:00 to 23:00) and 8 hour L_{Aeq8hr} for night (23:00 to 07:00). It should be noted that in considering the measured results at 5 minute intervals the L_{AFMax} during the night hours of 23:00 to 07:00 exceeded 60dB on more than 10 occasions on the night of April 7th/8th which, in accordance with *ProPG*, means that the site should not be regarded as negligible risk. The highest daily values measured over the survey period including the +1dB correction are summarised in Table (7) as follows.

Descriptor.	April 7th / 8th
$L_{Aeq\ 8hr.}$	***51dB***
$L_{Aeq\ 16hr.}$	***56dB***
L_{den}	***62dB***

Table (7) *Corrected noise survey results.*

It is clear from the corrected noise survey results and *stage 1– Initial Site Noise Risk* Assessment shown above that development of the site, without noise mitigation, must be regarded as low risk. At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

10.0 Developed Site Layout: The layout of the proposed development is shown in Fig. (2) as follows.

Fig.(2) 11.0

11.0 Noise Criteria: There are no statutory limits on noise in dwellings and for guidance we refer to BS 8233: 2014 – *Guidance on sound insulation and noise reduction for buildings*, sets out recommended internal noise levels for several different building types from external noise sources. The recommended indoor ambient noise levels for residential dwellings are set out in Table (8) below and 30dB(A) for bedrooms, at night, would appear to be appropriate noise criterion for this residential development. This would agree with World Health Organisation (WHO) requirements which states the following *"Community Noise"*: *"…a level of less than 30dB(A) L_{eq} is recommended to preserve the restorative process of sleep"* This criteria could be relaxed to 35/40dB(A) for living or dining areas.

Activity.	Location	Day	Night
		07:00 to 23:00	23:00 to 07:00
		dB $L_{Aeq,16hour}$	dB $L_{Aeq,8hour}$
Resting	Living room	35	30
Dining	Dining room/area	40	
Sleeping (daytime resting)	Bedroom	35	

Table (8) *Indoor Ambient Noise Levels for dwellings from BS8233-2014*

12.0 External Noise Level: The corrected noise level measured at the south end of the site at night was $L_{Aeq\ 8hr.}$51dBL_{Aeq}, and $L_{Aeq\ 16hr.}$56 dBL_{Aeq} daytime, all as per. Table (7) page (13).

13.0 Internal Noise Levels: The direct and reverberant sound pressure level break-in noise to any room within the proposed development is given by the following expressions.

Direct noise level: $L_{internal} = L_{facade} – R$ ($L_{facade} = L_{measured}$+ 3dB)

Reverberant noise level: $L_{internal} = L_{facade} – R – 10\log A + 10\log S + 6$

Where R is the airborne sound reduction, A = Total room absorption = 0.161V/T,

V = room volume m^3 & T = room reverberation time, taken as 0.5 seconds (typical for a bedroom) and S is the area of the building element considered. Accepting that the glazing is the weakest acoustic element in the exterior envelope of the dwellings we assess the degree of noise breakin through windows.

Type E houses would be located on the south west end of the site and as such exposed to noise levels in the order of 51 dBL_{Aeq} at night. The Type E house has two upper floor bedrooms looking south, namely Bedroom 3, measuring 11.4 m^2 and Bedroom 2, measuring 12m^2 each with windows estimated at 3.3m^2. Applying the above formulae to determine the glazing sound insulation for an internal noise of 30dB(A) provides the following.

A = 0.161 X 12 X 2.5/0.5 = 9.6 10log = 10

S = 2.2 X 1.5 = 3.3, 10log = 5

Accordingly for the Direct Noise Level R_w = 51 + 3 -30 = 24dB Reverberant Level R_w = 51 – 30 – 10 + 5 + 6 = 22dB.

This means that in order to control break in noise to the bedroom to 30dB(A) the windows need to exhibit a minimum airborne sound insulation value of R_w 24dB. However as this is a calculated value we should add + 6 dB to provide an installed or apparent value of R'_w 30`dB or in glazing terms this would require a typical 6/12/8 (pane/cavity/pane) configuration or equivalent.

Whilst the glazing airborne sound insulation performance is based on south facing windows all other facades should be similarly glazed.

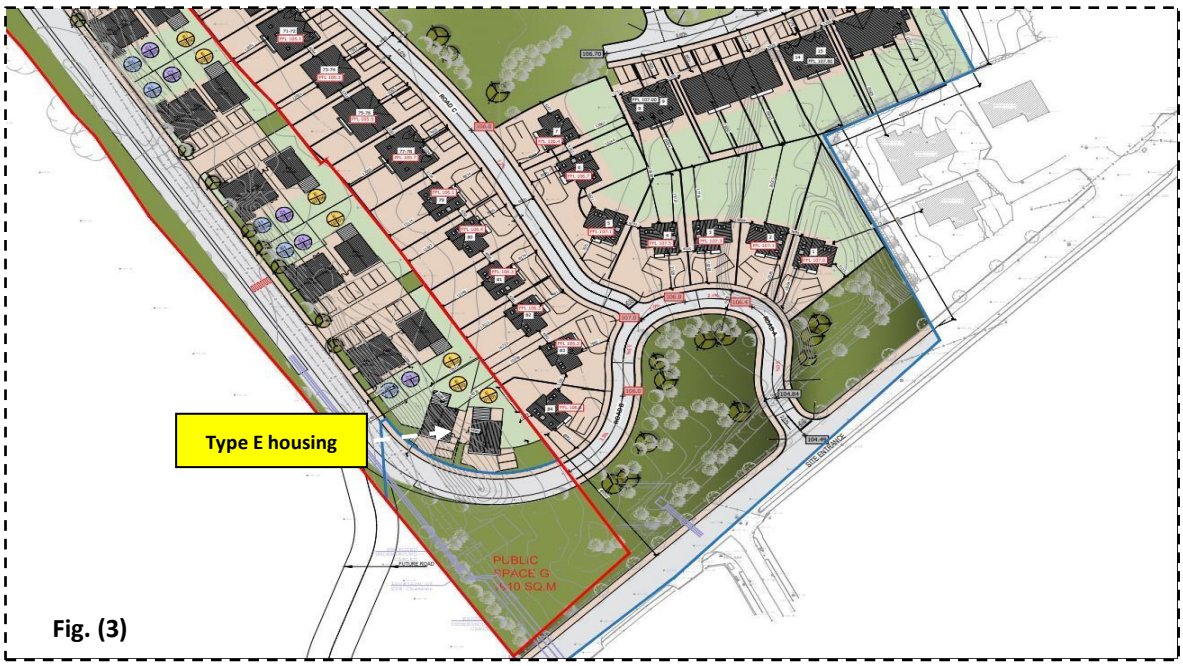


Fig. (3)

14.0 Open Windows:

Table (7) page (13) above shows the corrected worst case scenario day and night time noise level measured at the site as 56dB(A) & 51dB(A).

It is appropriate to derive internal noise levels based on the external noise noted above.

This is done by factoring in the degree of noise reduction afforded by a partially open window. BS 8233 suggests this is in the range 10 to 15dB, WHO *"Community Noise"* states this as 15dB and there is more recent evidence[1] to suggest that the degree of noise reduction afforded by a partially open window is typically greater than 15dB. For the purpose of deriving an internal noise level based on the BS 8233 an inside-to-outside correction of 15dB is used, resulting in an internal noise level between 41dB(A) for day and 36dB(A) for night, both of which are within acceptable limits.

15.0 Design criteria for external noise.

British Standard BS8233:2014 states that for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 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.

[1] Laboratory Airborne Sound Insulation Data for a Top Hung Window at a Range of Window Opening Distances (Source: Anderson and Hopkins 2005)

Reference to Table (7) above shows that noise arriving at the public space on the south end of the site, to the front of houses Type E, are subjected to corrected daytime noise levels of 56dB(A) or 62dB L_{den}. As one moves north this will reduce by at least 3dB(A) in accordance with the noise survey results, placing noise in the northly open space areas at 53dB(A) or 59dB L_{den}. The 56dB(A) at the southern tip of the site would be a not significant 1dB(A) above the limit suggested by British Standard BS8233:2014 and *ProPG* document, with all other public space noise levels being within acceptable limits and all in accordance with the 70dB L_{den} set out in Section 4.2.1 of the Kildare County Council Third Action 2019-2023.

16.0 Construction Phase:

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the *British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise*.

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

This document sets out guidance on permissible noise levels relative to the existing noise environment. The table below sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by BS 5228 – 1. These are cumulative levels, i.e. the sum of both ambient and construction noise levels. The appropriate construction noise limits will be identified as part of the detailed EIAR noise assessment.

Assessment category and threshold value period (L_{Aeq})	**Threshold value, in decibels (dB)**		
	Category A Note A	**Category B** Note B	**Category C** Note C
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends Note D	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

Table (5) Example Threshold of Significant Effect at Dwellings

Note A) *Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.*
Note B) *Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.*
Note C) *Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.*
Note D) *19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.*

It should be noted that this assessment method is only valid for residential properties. This assessment process determines if a significant construction noise impact is likely.

Notwithstanding the outcome of this assessment, the overall acceptable levels of construction noise set out in the Transport Infrastructure Ireland (TII) publication *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*[2], which should not be exceeded at noise sensitive locations during the construction phase of the development. The Table below sets out these levels.

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq(1hr)}$	L_{Amax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00 to 16:30hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30hrs	60*	65*

Table (6) Maximum Permissible Noise Levels at the Facade of Dwellings during Construction

***Note** *Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.*

In exceptional circumstances there may be a requirement that certain construction works are carried out during night time periods.

17.0 Conclusion:

It is established that the main contribution to noise during the noise survey was road traffic noise arriving at the site from the M7 located to the south.

Assessment in accordance with ProPG shows that the site is suitable for development provided that certain noise reduction measures are implemented.

The glazing of all dwellings included in the proposed development would be considered the weakest acoustic element in the exterior envelopes of the various dwellings.

The airborne sound insulation of glazing throughout the development has been specified and is designed to ensure that break-in noise to dwellings will not exceed guidelines set out in BS 8233-2014 or WHO *"Community Noise."*

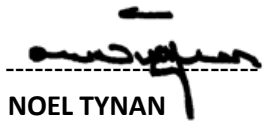
The public space on the southern end of the site can occasionally be subjected to noise levels exceeding the level of 55dB(A) set out in the *ProPG* document by a not significant 1dB(A) with all other public spaces being within preferred limits.

Predicted noise levels on the site are withing the limits set out in Kildare County Council Noise Action Plan 2019-2023.

[2] *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004*, Transport Infrastructure Ireland

We trust we have suitably addressed the questions posed and should any points require clarification please find the writer at your disposal.

Yours on behalf of Decibel Noise Control.



NOEL TYNAN

Acoustic consultant.

19.0 Terminology.

Equivalent Continuous (A) Weighted Sound Level [$L_{Aeq\ T}$]:

This can be regarded as a notional level which would, in the course of the measuring period (T), cause the same (A) weighted sound energy to be received as that due to the actual sound over the actual measuring period.

L_{Amax} : The maximum noise measured during the measurement period.

Weighted Airborne Sound Reduction Index [R_W]:

This value is derived by comparing the measured Sound Reduction Index (S.R.I.) in sixteen one third octave bands [100Hz to 3150Hz] with a set of reference values.

R'_W : Is the apparent value after due allowance for installation degradation.

L_{den} : This is an indicator that is a composite of long term L_{Aeq} values for day, evening & night (L_{day}, $L_{evening}$ & L_{night}) and is calculated:

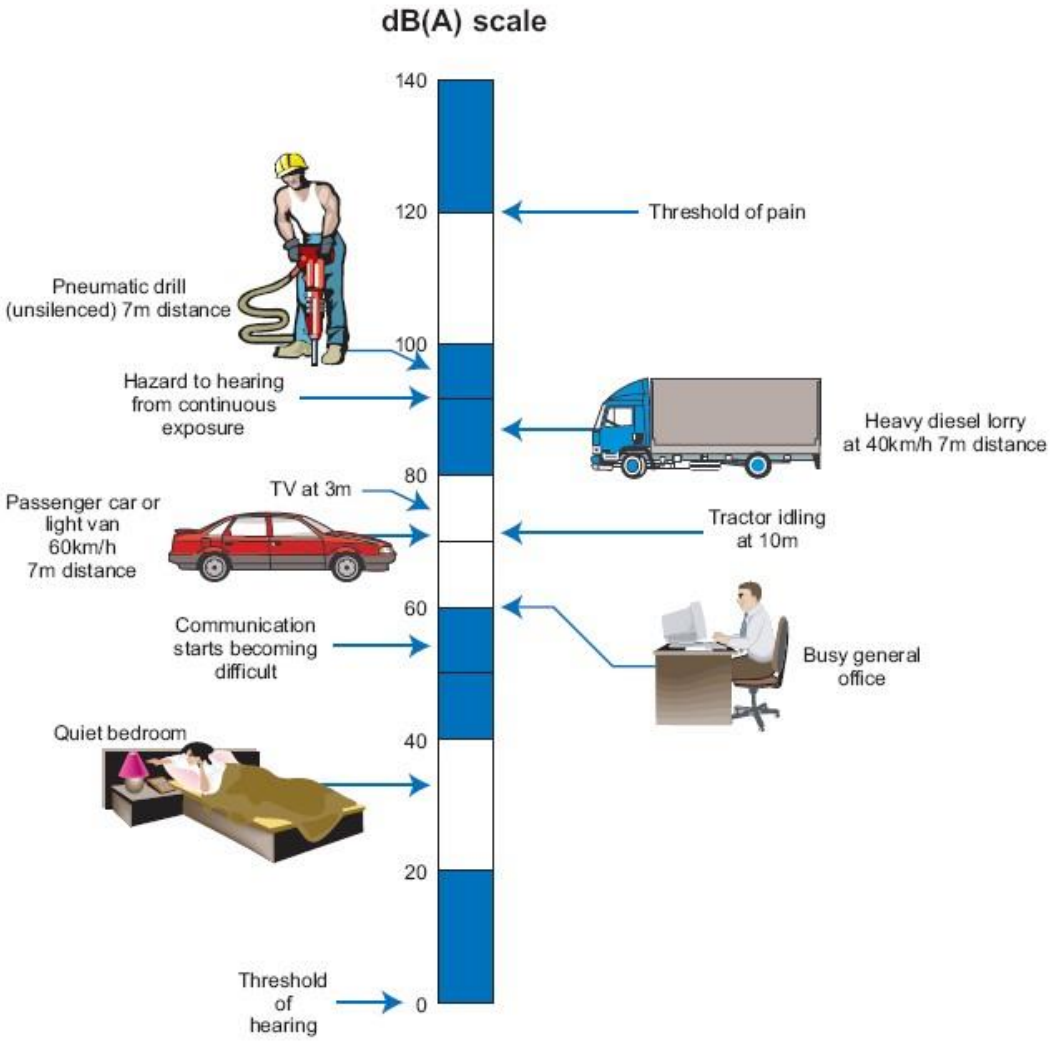
$L_{den} = 10\log_{10} (1/24) (12x10^{L_{day}/10}+4x10^{(5+L_{evening})/10}+8x10^{(10+L_{night})/10})$ dB(A) Where:

L_{day} = 07:00 hrs to 19:00 hrs.

$L_{evening}$ = 19:00hrs to 23:00hrs

L_{night} = 23:00hrs to 07:00hr

$L_{Aeq,8h}$ 23:00-07:00 & $L_{Aeq,16h}$ 07:00-23:00 is the equivalent continuous noise level over an 8 or 16 hour periods



The level of typical common sounds on the dB(A) scale.

(NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004