ASSESSMENT OF INWARD TRAFFIC NOISE IMPACT

LANDS IN THE TOWNLANDS OF COMMONS WEST, BOYCETOWN AND KILCOCK (ADJACENT TO THE EXISTING BRAYTON PARK ESTATE), KILCOCK, CO. KILDARE

Technical Report Prepared For

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EXECUTIVE SUMMARY

AWN Consulting has been requested by Rycroft Homes Ltd to undertake an assessment of the potential noise impact associated with road traffic noise from the M4 Motorway and rail noise from the Dublin to Sligo/Longford line, on the proposed residential development at - lands in the townlands of Commons West, Boycetown and Kilcock (adjacent to the existing Brayton Park estate), Kilcock, Co. Kildare.

For the assessment of noise, guidance has been taken from the following documents:

- *Kildare Local Authorities Noise Action Plan For the second round of noise action planning under the Environmental Noise Regulations 2006* (2013);
- World Health Organization (WHO) *Environmental Noise Guidelines for the European Region*, and;
- BS 8233 (2014) *Guidelines for sound Insulation and noise reduction for buildings.*

The following daytime and night time internal noise criteria are proposed:

- 35dB $L_{Aeq,T}$ daytime within living / bedrooms;
- 40dB $L_{Aeq,T}$ daytime within dining rooms, and;
- 30dB $L_{Aeq,T}$ night-time within bedrooms.

Using the development building layout provided by the design team and the results of the noise surveys conducted on site, noise levels to internal and external locations across the proposed development have been predicted. In order to control noise impacts the following mitigation measures are proposed:

- 2.5m high noise barrier along the southern site boundary;
- Enhanced glazing to the most exposed facades facing the M4, and;
- Acoustic vents to the most exposed facades (i.e. at locations where the internal design goals cannot be met with windows in the open position).

Following the implementation of the mitigation recommendations outlined above, the internal noise environment within the sensitive areas of the development are predicted to be within the recommended criteria adopted from BS 8233.

With the proposed installation of the acoustic barrier along the southern site perimeter it is considered that external noise levels in amenity areas will be mitigated so as to achieve the lowest practicable levels, within reasonable design constraints, as advised by BS 8233.

In conclusion, with the implementation of mitigation measures proposed within this report, the noise impact of M4 traffic noise and rail noise on the proposed residential development can be controlled such that the impact is not significant or of a level that would have a significant negative impact on the residential amenity of the proposed dwellings and outdoor spaces.

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1.0 INTRODUCTION

AWN Consulting has been requested by Rycroft Homes Ltd to undertake an assessment of the potential noise impact associated with road traffic noise from the M4 Motorway and rail noise from the Dublin to Sligo/Longford line, on the proposed residential development at lands in the townlands of Commons West, Boycetown and Kilcock (adjacent to the existing Brayton Park estate), Kilcock, Co. Kildare. The noise impact assessment is being carried out in order to ensure a good environment for residential amenity is provided.

The site in question is adjacent to the M4 Motorway at Junction 8. The site is bounded to the south and southwest by the M4, to the north and northwest by farmlands and the Dublin-Longford rail line, with the R148 and beyond and to the east by existing residential dwellings.

It is proposed to use guidance from British Standard BS 8233 (2014) *Guidelines for sound Insulation and noise reduction for buildings* and the WHO document *Environmental Noise Guidelines for the European Region* for setting out appropriate design criteria for the site. The assessment methodologies contained within these guidance documents are considered to be current best practice for the assessment of traffic noise on residential developments. Furthermore, these methodologies have been accepted by the Planning Authority on other similar developments.

This report will include the following:

- Review of the relevant content of the standards that will be used for the noise assessment;
- Comment on the expected noise levels across the site, and;
- Review of mitigation measures that will be considered in relation to the levels of noise incident on the site.

2.0 ASSESSMENT CRITERIA

We have made reference to the following documents relating to the assessment of the potential impact of road traffic noise intrusion.

2.1 Kildare Noise Action Plan

The *Kildare Local Authorities Noise Action Plan For the second round of noise action planning under the Environmental Noise Regulations 2006 (2013)* has been published in order to address the requirements of the European Noise Directive 2002/49/EC. This document produced noise maps in order to identify locations exposed to existing levels of environmental noise for which it may be considered appropriate to address the exposure through mitigation measures.

The Action Plan defined the following proposed onset levels, for assessment of noise mitigation measures due to exposure to road and rail traffic noise:

- 70 dB, L_{den}, and;
- 57 dB, L_{night}.

The Action Plan also comments that *The noise levels used do not constitute any form of design guideline for noise management, nor do they necessarily indicate that at or above such levels the environmental noise should be considered undesirable*. As such it is considered appropriate to review other appropriate guidance documents in order to arrive at an appropriate design guidance and noise criteria for the proposed development.

2.2 WHO Environmental Noise Guidelines for Europe

The World Health Organisation (WHO) have published in October 2018 Environmental Noise Guidelines for the European Region. The objective of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise from transportation, wind farm and leisure sources of noise. The guidelines present recommendations for each noise source type in terms of L_{den} and L_{night} levels above which there is risk of adverse health risks.

However, It should be noted that the WHO guideline values referred to here are recommended to serve as the basis for a policy-making process to allow evidence based public health orientated recommendations. They are not intended to be noise limits and the WHO document states the following regarding the implementation of the guidelines,

> *"The WHO guideline values are evidence-based public health-oriented recommendations. As such, they are recommended to serve as the basis for a policy-making process in which policy options are considered. In the policy decisions on reference values, such as noise limits for a possible standard or legislation, additional considerations – such as feasibility, costs, preferences and so on – feature in and can influence the ultimate value chosen as a noise limit. WHO acknowledges that implementing the guideline recommendations will require coordinated effort from ministries, public and private sectors and nongovernmental organizations, as well as possible input from international development and finance organizations. WHO will work with Member States and support the implementation process through its regional and country offices."*

It is therefore not intended to refer to the WHO guidelines in an absolute sense as part of this assessment and it will be a decision for national and local policy makers to adopt the WHO guidelines and propose noise limits for use.

2.3 British Standard BS 8233

The standard, BS 8233 (2014) *Guidelines for sound Insulation and noise reduction for buildings,* sets out recommended internal noise levels for several different building types from external noise sources such as road traffic noise. The guidance is primarily for use by designers and hence BS 8233 may be used as the basis for an appropriate schedule of noise control measures. The recommended internal noise levels for residential developments are set out below.

Criterion	Typical situation	Desirable Level $L_{Aeq,T}$ (dB)
Indoor Ambient Levels	Living Rooms	35
	Dining Rooms	40
	Bedrooms Night-time	30
	Bedrooms Daytime Resting	35

Table 1 Summary of recommended internal noise levels from BS 8233

In relation to noise levels in external amenity areas, BS 8233 provides the following guidance:

> *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.*

2.4 Summary

In summary, and with consideration of the guidelines discussed here it is considered appropriate to adopt the following criteria for the project:

- 35dB $L_{Aeq,T}$ daytime within living / bedrooms;
- 40dB $L_{Aeq,T}$ daytime within dining rooms;
- 30dB $L_{Aeq,T}$ night-time within bedrooms.

External noise levels in amenity areas will be mitigated so as to achieve the lowest practicable levels, within reasonable design constraints, through the provision of acoustic treatments to the site boundary adjoining the M4 motorway. Rail movements along the rail line to the east have also been taken into consideration.

3.0 RECEIVING ENVIRONMENT

A series of environmental noise surveys were conducted at the development site as part of the assessment. The noise survey was conducted in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2007: *Acoustics – Description, measurement and assessment of environmental noise.* Specific details are set out below.

3.1 Choice of Measurement Locations

Three measurement locations were selected and are shown on Figure 1; each is described in turn below.

Location 1 is located at the approximate façades of the proposed residential properties nearest to the M4 at the southern end of the site.

Location 2 is located at the approximate façades of the proposed residential properties to the north-west of the site.

Location 3 is located near the northern boundary of the site.

Location 4 is located at the approximate façades of the proposed residential properties at the eastern end of the site.

Location 5 is located adjacent to the rail line, some 1.8km to the south east of the site. Measurements of rail movements at this location are representative of the section of rail line adjacent to the proposed development site.

Figure 1 Noise Survey Locations

3.2 Survey Periods

Unattended noise measurements were conducted at Location 1 over the course of the following survey period:

- 09:45hrs on 30 September to 13:45hrs on 5 October 2015.

Attended noise measurements were conducted at Locations 2 to 5 over the course of the following survey periods:

- Location 2, 3 and 4: 14:33hrs to 17:08hrs on 30 September 2015.
- Location 5: 15:25hrs to 15:55hrs on 1 May 2019.

The measurements cover typical daytime period that was selected in order to provide a typical snapshot of the existing noise climate.

The weather during the survey periods were dry and calm.

3.3 Personnel and Instrumentation

Gary Duffy (Enfonic) and Donogh Casey (AWN) performed the measurements during the survey periods. The attended noise measurements were performed using Brüel & Kjær Type 2238 and 2250 Precision Sound Level Analysers.

Before and after the survey the measurement apparatus was check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator.

3.4 Procedure

Attended noise measurements were conducted at Locations 2 to 4 on a cyclical basis. The results were noted onto a Survey Record Sheet immediately following each sample, and were also saved to the instrument memory for later analysis where appropriate. Survey personnel noted all primary noise sources contributing to noise build-up. Sample periods for the attended noise measurements were 15 minutes.

Sample measurements of rail movements were captured at a position set back from the rail line.

3.5 Measurement Parameters

The noise survey results are presented in terms of the following parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{Amax} is the instantaneous maximum sound level measured during the sample period.

L_{Amin} is the instantaneous minimum sound level measured during the sample period.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

SEL Sound exposure level – a measure of the A-weighted sound energy used to describe noise events such as the passing of a train or aircraft; it is the A-weighted sound pressure level if occurring over a period of 1 second, would contain the same amount of A-weighted sound energy as the event.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

3.6 Results and Discussion

3.6.1 Location 1

The survey results for Location 1 are summarised in Tables 2 and 3 below. Results are presented in terms of the average daytime and night-time noise levels over the course of the survey.

Date	Sound Pressure Level (dB re $2x10^{-5}$ Pa)					Weather		
	L_{Aeq}[1]	L_{AFmax}[2]	L_{AFmin}[3]	L_{AF10}[4]	L_{AF90}[4]	Wind Speed[5]	Rainfall	Temp[6]
30-Sep	66	94	54	67	63	5	N	12-14
01-Oct	63	86	52	64	60	2.5	N	10-16
02-Oct	61	77	50	62	57	2	N	10-14
03-Oct	64	74	48	64	60	2	N	8-10
04-Oct	70	83	51	72	66	6	N	8-14
05-Oct	67	98	52	68	63	6	Y	12-17

Table 2 Summary of Measured Daytime Noise Levels (07:00 to 23:00)

Date	Sound Pressure Level (dB re $2x10^{-5}$ Pa)					Weather		
	L_{Aeq}[1]	L_{AFmax}[2]	L_{AFmin}[3]	L_{AF10}[4]	L_{AF90}[4]	Wind Speed[5]	Rainfall	Temp[6]
30-Sept / 1-Oct	62	75	36	63	54	<1	N	6-10
01-02 Oct	57	70	31	58	50	1.5	N	8-9
02-03 Oct	57	79	39	59	50	1.5	N	7-8
03-04 Oct	62	90	39	64	54	3	N	4-7
04-05 Oct	64	78	33	65	52	5.5	Y	12-13

Table 3 Summary of Measured Night-time Noise Levels (23:00 to 07:00)

The results indicate that the ambient daytime noise levels ranged from 61 to 70dB L_{Aeq}. The higher value of 70dB L_{Aeq} was measured during periods when winds were elevated and are considered to have influenced measurements. During calmer periods the ambient daytime noise levels ranged from 61 to 64dB L_{Aeq}.

1 Logarithmic average of measured 15 minute values
2 Highest recorded 15 minute value during period
3 Lowest recorded 15 minute value during period
4 Arithmetic average of measured 15 minute values
5 Approximate Average metres second (source: met.ie/climate/daily-data.asp)
6 Approximate temperature range ºC (source: met.ie/climate/daily-data.asp)

The ambient night-time noise levels ranged from 57 to 64dB L_{Aeq} with maximum levels typically ranging from 70 to 79dB L_{AFMax} although there was a single value of 90dB L_{AFMax} measured at 23:00hrs on 3 Oct 2015, which is considered to be an outlier. During calmer weather conditions and periods without rainfall the ambient night-time noise levels ranged from 57 to 62dB L_{Aeq} with maximum levels typically ranging from 70 to 79dB L_{AFMax}.

The noise climate was typically dominated by road traffic movements along the M4..

3.6.2 Location 2

The survey results for Location 2 are summarised in Table 4.

Start Time	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
15:08:59	56	65	49	58	52
16:02:21	56	65	48	58	53
16:53:56	57	69	48	59	53

Table 4 Summary of noise measurements at Location 2

The noise climate was dominated by distant road traffic movements from the M4. Other sources noted were local traffic, birdsong and distant construction activity. A jet overhead was influencing the measurements in the second sample period. Ambient noise levels were in the range 56 to 57dB L_{Aeq} and background noise levels were in the range 52 to 53dB L_{A90}.

3.6.3 Location 3

The survey results for Location 3 are summarised in Table 5.

Start Time	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
14:52:24	51	65	47	52	49
15:45:28	50	61	45	51	48
16:37:30	50	67	45	52	47

Table 5 Summary of noise measurements at Location 3

The noise climate was dominated by distant road traffic movements from the M4. Other sources noted were local traffic, birdsong and distant construction activity. A jet overhead was influencing the measurements in the first and third sample periods. Ambient noise levels were in the range 50 to 51dB L_{Aeq} and background noise levels were in the range 47 to 49dB L_{A90}.

3.6.4 Location 4

The survey results for Location 4 are summarised in Table 6.

Start Time	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
14:33:13	49	57	45	51	47
15:27:58	55	79	48	54	50
16:19:25	51	60	47	52	49

Table 6 Summary of noise measurements at Location 4

The noise climate was dominated by distant road traffic movements from the M4. Other sources noted were local traffic, birdsong and distant construction activity. A jet overhead was influencing the measurements in the second and third sample periods. Ambient noise levels were in the range 49 to 55dB L_{Aeq} and background noise levels were in the range 47 to 50dB L_{A90}.

3.6.5 Location 5

Sample measurements of rail movements were captured for Dublin-bound train and a Sligo-bound train. The measurements are summarised below.

Activity	Duration	Distance	SEL
Train movement (Dublin)	29s	3m	92dB
Train movement (Sligo)	24s	3m	92dB

Table 7 Calculated SELs

3.6.6 Comment on Noise Survey

Data from the baseline noise survey carried out in 2015 to assess the previous site layout has been used to inform the assessment of impact of traffic noise. AWN are satisfied that the survey data is robust considering that, in the interim, there has been no change in road alignment or increase in traffic volumes significant enough to cause an increase in noise levels across the development site.

Where the updated site layout has extended close to the rail line to the east, a noise survey was carried out in May 2019 to address this new aspect of the assessment.

4.0 ASSESSMENT OF THE DEVELOPMENT SITE

Based on the results of the noise monitoring that has been conducted on site, it is considered that the subject site can be suitable for residential development once consideration is given to appropriate noise mitigation measures.

Mitigation measures will be required in the western sector of the site to ensure that internal noise levels are controlled to within the values outlined in Section 2.3, either with windows in the open position or with the inclusion of attenuated ventilators at locations where the internal design goals cannot be met with windows in the open position. Additionally, external noise levels in amenity areas will be mitigated so as to achieve the lowest practicable levels, within reasonable design constraints, through the provision of acoustic treatments to the site boundary adjoining the M4 motorway.

Rail noise from the rail line running south east to north west has been considered as part of the inward impact assessment. It has been assumed that a non-solid boundary (e.g. fencing or vegetation) will run along the north east site boundary adjacent to the rail line. It is not required that mitigation be implemented in the sector of the site adjacent to the rail line. While momentary maximum noise levels will be generated by the intermittent rail movements, the frequency of these movements does not exceed the night time threshold, above which a requirement to address internal maximum levels is met.

Appropriate noise mitigation measures are discussed in detail in the following sections.

5.0 PROPOSED MITIGATION MEASURES

Based on the worst-case measured day and night-time noise levels presented in Section 3.0, the appropriate boundary treatment or sound insulation performance of the building envelope can be specified in order to achieve appropriate internal and external noise levels. Each element of proposed mitigation will be discussed in turn.

5.1 Boundary Treatment

It is recommended that a 2.5 metre high noise barrier be constructed along the southern boundary of the development site in order to provide some noise screening to both external and internal areas. Please note that this proposed acoustic screen has been taken into account in the noise predictions calculations outlined in the following sections.

Figure 2 shows the extent of the proposed noise barrier that is advised for the southern site boundary.

Figure 2 Proposed Location of Noise Barrier – Western Sector

The noise barrier is approximately 420m long and may consist of a number of options, such as a proprietary timber acoustic fence / earth bund / solid boundary wall. Additional advice and commentary on specific tender proposals can be provided on request.

Whilst it is acknowledged that BS8233 guidance recommends that outdoor noise levels should not exceed 55 dB L_{Aeq} with consideration of subsequent discussion in BS8233, it is noted that other factors (including the convenience of living and making efficient use of land resources) can influence a decision on an acceptable external noise level in amenity areas.

In such a situation, BS8233 recommends that development should not be prohibited, but should be designed to achieve the lowest practicable levels. In this case, and with consideration of the noise barrier proposed, it is expected that the 55dB L_{Aeq} target will be achieved in the vast majority of external amenity areas, however there may be a small number of amenity areas (typically in the front gardens of the residences closest to the M4 motorway), that will have noise levels slightly above 55dB L_{Aeq}.

It is considered that external noise levels in amenity areas will be mitigated so as to achieve the lowest practicable levels, within reasonable design constraints, as advised by BS 8233.

5.2 Glazing

As is the case in most buildings, the glazed elements of the building envelope are typically the weakest element from a sound insulation perspective. A standard thermal double glazed unit will provide adequate sound insulation performance for the majority of the proposed development buildings. However, for the buildings located close to the M4 and depending on the predicted noise level incident on a particular façade, it is necessary to use an enhanced double glazing specification to provide additional sound insulation performance. Table 8 lists the sound insulation performances used in this assessment.

Glazing Specification	Octave Band Centre Frequency (Hz)						Typical Glazing Configuration
	125	250	500	1k	2k	4k	
Enhanced	26	34	40	42	40	50	6-20-12

Table 8 Sound insulation performance requirements for glazing, SRI (dB)

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system (including doors). In the context of the acoustic performance specification the ‘glazing system’ is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc. Figure 3 illustrates the locations where the enhanced glazing specification is required.

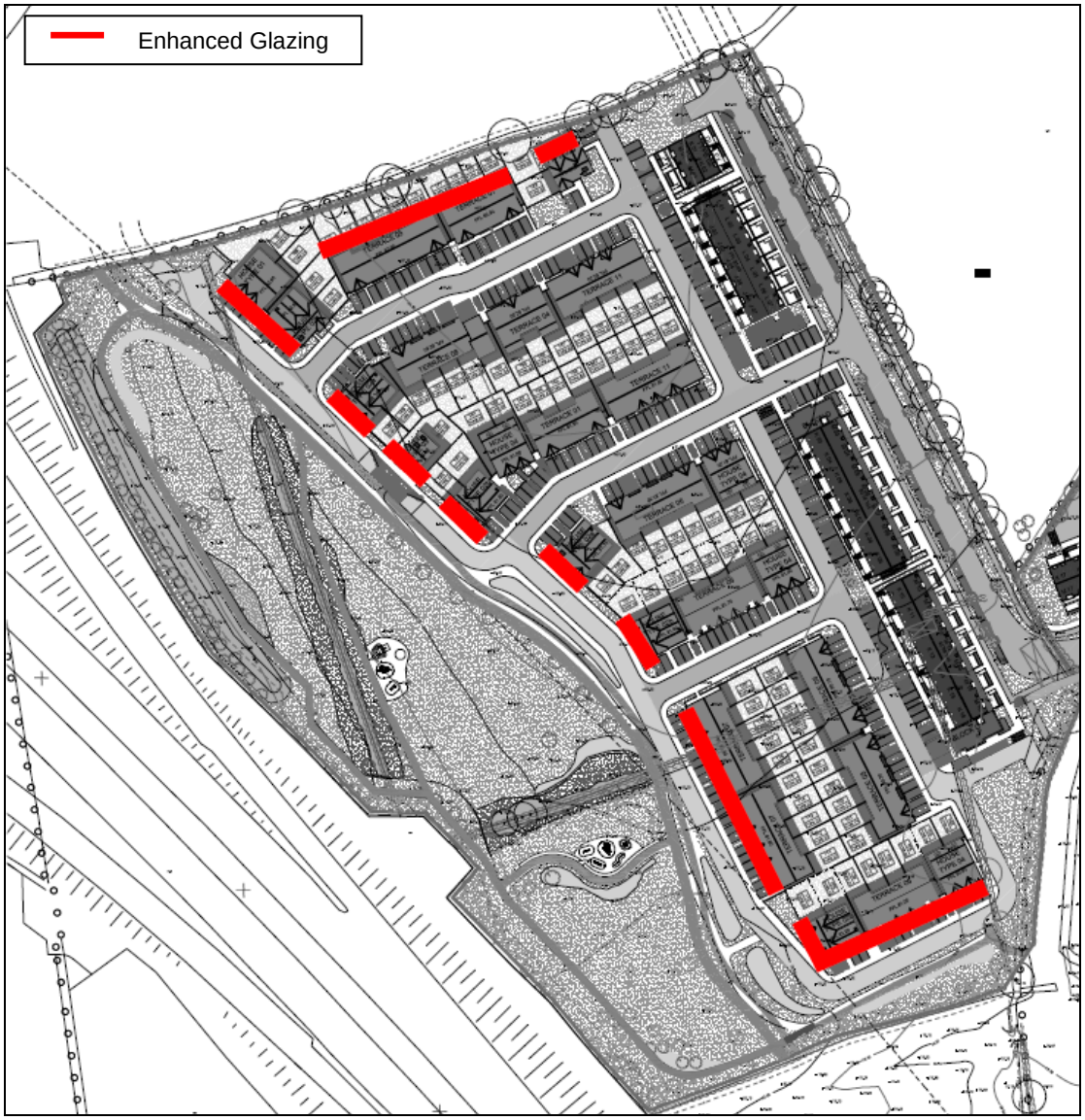

Figure 3 Proposed Façade Locations for Enhanced Glazing

5.3 Wall Construction

In general all wall constructions, i.e. block work or concrete, offer a high degree of sound insulation, much greater than that offered by the glazing systems discussed in Section 5.2. Therefore, noise intrusion via the wall construction will be minimal and no mitigation is required.

5.4 Ventilation

The ventilation strategy for the development will be in accordance with Part F of the Building Regulations and will be finalised at the detail design stage. Options which will be considered in order to achieve compliance with background ventilation requirements will be adjustable hit and miss acoustic ventilators or trickle vents built into the façade or window frames respectively. On those facades where noise mitigation is provided by the higher specification glazing, the standard vents should be upgraded to include internal baffles and acoustic insulation to achieve a sound insulation performance of 41dB $D_{n,e,w}$.

5.5 Summary

The applicant in this case has implemented the mitigation measures set out in this report as identified within the enclosed Architects drawings prepared by C+W O Brien Architects and the Landscape Masterplan prepared by Ronan MacDiarmada Landscape Architects.

In summary, the mitigation measures are:

- 2.5m high noise barrier along the southern boundary;
- Enhanced glazing to the most exposed facades along the M4, and;
- Acoustic vents to the most exposed facades (i.e. at locations where the internal design goals cannot be met with windows in the open position)..

With these measures in place, the predicted internal noise level within the most exposed buildings will be as follows:

Daytime (07:00hrs to 23:00hrs)

- Living / Bedrooms – 32dB L_{Aeq}, and;
- Dining Rooms – 32dB L_{Aeq}.

Night-time (23:00hrs to 07:00hrs)

- Bedrooms – 30dB L_{Aeq}.

The predicted internal noise levels in the most exposed dwellings are within the adopted design goals. The proposed installation of the acoustic barrier along the southern site perimeter it is considered that external noise levels in amenity areas will be mitigated so as to achieve the lowest practicable levels, within reasonable design constraints.

6.0 CONCLUSIONS

Using guidance outlined in the *Kildare Action Plan* and BS 8223:2014 the development site in question has been assessed considering the noise impact of the M4 Motorway and the railway line. Based on this assessment the development site has been found to have a noise environment that will be suitable for residential development once appropriate consideration is given to noise mitigation.

Using the development building layout provided by the design team and the results of the noise surveys conducted on site, noise levels at the facades of the proposed development have been predicted.

The applicant in this case has implemented the mitigation measures set out in this report as identified within the enclosed Architects drawings prepared by C+W O Brien Architects and the Landscape Masterplan prepared by Ronan MacDiarmada Landscape Architects.

The appropriate mitigation measures in relation to the sound insulation performance of the building envelope have been formulated, along with provisions for a 2.5m noise barrier along the southern boundary with the M4.

Glazing should be selected so as to provide, as a minimum, the octave band sound reduction indices set out in Table 9 below to those facades indicated in Figure 3.

Glazing Specification	Octave Band Centre Frequency (Hz)						Typical Glazing Configuration
	125	250	500	1k	2k	4k	
Enhanced	26	34	40	42	40	50	6-20-12

Table 9 Minimum Sound Reduction Index (SRI) Performance Requirements for Glazing

In addition, consideration will be given to the inclusion of acoustic attenuation to the ventilation strategy of the development at locations where the enhanced glazing is proposed (refer Figure 3). Typical acoustic measures that would allow for fresh air ventilation into the building with acoustic attenuation would be via adjustable hit and miss acoustic ventilators or trickle vents built into the window frame including internal baffles and acoustic insulation to reduce the noise transfer from the outside.

Following the implementation of the boundary noise barrier and glazing specifications outlined above the internal noise environment within the sensitive areas of the development are predicted to be within the recommended criteria adopted BS 8233.

The proposed installation of the acoustic barrier along the southern site perimeter it is considered that external noise levels in amenity areas will be mitigated so as to achieve the lowest practicable levels, within reasonable design constraints, as advised by BS 8233.

In conclusion, with the implementation of mitigation measures proposed within this report, the noise impact of the M4 and railway line on the proposed residential development can be controlled such that the impact is not significant or of a level that would have a significant negative impact on the residential amenity of the proposed dwellings and outdoor spaces.