

# Noise Impact Assessment and Acoustic Design Statement Strategic Housing Development



On behalf of  
**Bellmount Developments Limited**  
**Redforge Road, Blackpool, Cork**







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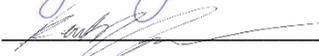
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**Noise Impact Assessment and Acoustic Design Statement**  
**Strategic Housing Development**  
**Bellmount Developments Limited**  
**Redforge Road, Blackpool, Cork**

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## EXECUTIVE SUMMARY

Malone O'Regan Environmental (MOR) has been commissioned by Bellmount Developments Limited (herein referred to as 'Bellmount') to provide a noise impact assessment of the proposed development of a Strategic Housing Development (SHD) and all associated works at Redforge Road, Blackpool, Cork City ('the Site').

A detailed ambient acoustic survey was completed by MOR on Tuesday 11<sup>th</sup> May 2021 in accordance with ISO 1996-2:2017. The survey was completed during daytime hours (7am – 11pm) and night-time hours (11pm - 7am).

The assessment included baseline acoustic monitoring which characterised the existing acoustic environment. The daytime sound ranged from  $L_{Aeq,T}$  57dB to 67dB and background levels (as  $L_{A90,T}$  values) ranged from 51dB to 56dB.

The night-time  $L_{Aeq, 15min}$  ranged from 49dB to 59dB and background levels ( $L_{A90,15min}$ ) ranged from 36dB to 46dB.

The local ambient environment was influenced by commercial activities onsite (daytime only), traffic on the Redforge Road, distant traffic on surrounding roads and from rail noise from the adjacent railway track.

Noise Sensitive Receptors (NSRs) are present less than 5m from the Site's boundary. The construction phase will be of ca.24 months in duration and a detailed Construction Environmental Management Plan (CEMP) developed by the appointed Contractor will ensure mitigation measures are implemented onsite. Therefore, the predicted construction noise will comply with the daytime limit of  $L_{Aeq,1hour}$  70dB at NSRs.

A detailed assessment was completed in line with the principles of Professional Practice Guidance on Planning and Noise (ProPG). Acoustic design has been implemented within the design, layout and fit out of the proposed apartments. As part of the design, enhanced glazing systems with a sound reduction of  $\geq 37$ dB will be utilised to ensure a good internal acoustic environment when windows are closed. The internal noise levels when windows are left open will be above the recommended limit, however this will be a choice for future occupants.

Operational noise associated with the proposed development is predicted to have no adverse impact to offsite NSRs or proposed future onsite NSRs.

The proposed design will present some acoustic sheltering from the roadside pathway,

The two private external amenity areas (western amenity area/courtyard and the Rooftop garden) are predicted to be below the ProPG recommended noise level range of  $L_{Aeq, 16hour}$  50-55dB during the daytime due to both the barrier effect provided by buildings and the Roof Garden's design above the Redforge Road.

# 1 INTRODUCTION

Malone O'Regan Environmental (MOR) has been commissioned by Bellmount Developments Ltd. ('the Applicant') to provide a noise assessment of the proposed Strategic Housing Development (SHD) and all associated works on lands at Millfield Service Station, Redforge Road, Blackpool, Cork. The location of the proposed development ('the Site') is shown in Figure 1-1.

**Figure 1-1 Site Location**



## 1.1 Scope

This assessment is based upon the request by An Bord Pleanála (ABP - 308537-20) which states:

*5. An inward noise impact assessment having regard to the proximity of the proposed development to the adjoining mainline railway which should include specific design mitigation measures to ensure that a satisfactory standard of amenity for future residents is achieved.*

The Professional Practice Guidance on Planning and Noise (ProPG), published in 2017 for the assessment of site suitability for residential development, and the acoustic design requirements has been utilised within this assessment. This methodology assesses the suitability of the location for residential development, and the acoustic design it should implement to present a comfortable future acoustic environment.

The ProPG assessment involved the following:

- Identifying local noise sources;
- Characterising the existing acoustic ambient environment;
- Assessment of acoustic Impact;
- Undertaking Stage 1 - initial noise risk assessment; and
- Undertaking Stage 2 – full acoustic assessment.

Furthermore, ISO 9613 has been incorporated into this assessment for the likely operational noise impact from the proposed development on existing and future noise sensitive receptors.

This report also includes a BS5228 assessment on the likely impact to existing noise sensitive receptors during the construction stage of the proposed development.

## 2 METHODOLOGY

The following documentation was reviewed and utilised in the preparation of this report:

- *Professional Practice Guidance on Planning and Noise (ProPG), New Residential Development*, Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), May 2017 [1];
- BS 4142:2014 *'Methods for rating and assessing industrial and commercial sound 2014'*; [2]
- BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* [3];
- WHO *Environmental Noise Guidelines for Europe*, 2018; [4]
- Smith BJ, Peters RJ, and Owen S, *'Acoustics and Noise Control'* 2nd Ed., 1996 [5];
- ISO 9613 Parts 1 & 2 *'Acoustics – Attenuation of sound during propagation outdoors'* [6, 7];
- ISO 1996-1:2016 *'Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures'* [8];
- ISO 1996-2:2017 *'Acoustics – Description, measurement and assessment of environmental noise – Part 2 Determination of sound pressure levels'* [9];
- EPA *'Guidance Note for Noise: Licence Applications, Surveys, and Assessment in Relation to Scheduled Activities (NG4)'*, 2016 [10];
- AACI *'Environmental Noise Guidance for Local Authority Planning & Enforcement Departments'* Association of Acoustic Consultants of Ireland, 2019;
- BS 5228-1:2009+A1:2014, *Code of practice for noise and vibration control on construction and open sites, Noise* [11];
- Cork City *Development Plan 2015-2021* [12]; and
- Cork Agglomeration Area *Noise Action Plan 2018-2023* [13].

A full glossary of terms is presented in Appendix A. A glossary of terms of the main parameters utilised are detailed below:

$L_{Aeq,T}$  is the equivalent continuous sound level, used to describe the fluctuating noise in terms of a single noise level over the same sampling time period (T); and,

$L_{A90,T}$  is the A-Weighted noise level in the lower 90 percentile of the sampling interval 'T', excludes intermittent features typical of traffic and typically utilised to describe background noise.

**Rw** is the weighted sound reduction index used to rate the sound proofing effectiveness of a material. The higher the Rw number, the better a sound insulator the material is.

**NSR** is a noise sensitive receptor, including homes, hospitals, and amenity spaces.

**NM** is a noise monitoring location.

### 2.1 Competency

The desk-based assessment and monitoring programme, analysis of the data and project management was conducted by a Principal MOR acoustician, with over 14 years' experience and a Member of the Institute of Acoustics (MIOA) Association of Acoustic Consultants of Ireland (AACI). The noise assessment has therefore been completed by a 'competent person'.

## 2.2 Desk Based Assessment

The assessment incorporated the following elements:

- Review of all drawings submitted to MOR;
- Characterisation of the local noise environment utilising published and publicly available information including the Cork City Council *Noise Action Plan 2018-2023*; and,
- Review of best practice UK guidance for noise impact assessments in the current absence of an Irish or recognised International project specific standard or guidance document.

### 2.2.1 Site Context

The subject site at Millfield Service Station comprises a stated area of 0.73ha, located adjacent to Blackpool District Centre, approx. 2km north of Cork City Centre. The Site is currently in use as a vehicle re-fuelling station and associated uses including a car wash.

The Site has frontage of approx. 84m to Redforge Road to the east.

To the north and northwest of the Site, Millford Cottages comprise modest two-storey terraced cottages, of which five houses front onto Redforge Road while three face south towards the Site.

To the northwest of the Site, approx. 18 no. cottages that are currently in derelict state. Planning permission is in place for the demolition and replacement of these properties.

To the west of the Site, 4/5-storey commercial blocks back onto the Site, while the Blackpool Centre multi-storey car park is located to the south.

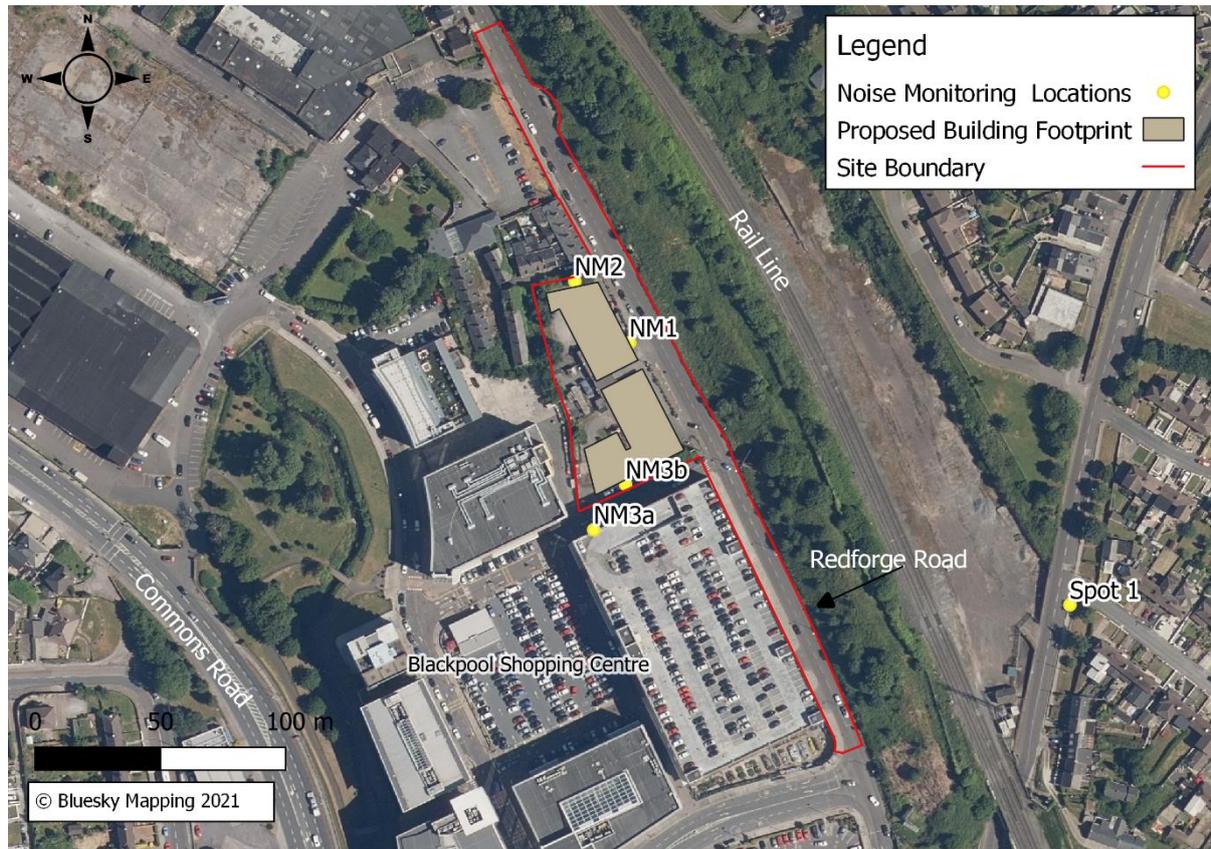
The Main Dublin –Cork railway runs north-south to the east of the Site, atop an overgrown embankment. There are proposals to develop a new railway station along this section of rail line, southeast of the Site.

## 2.3 Field Survey

A detailed noise survey was completed by MOR acousticians on Tuesday 11<sup>th</sup> May 2021 in accordance with ISO 1996-2:2017. This survey was completed during daytime hours (07:00 – 23:00) and night-time hours (23:00 -07:00).

The noise monitoring locations are illustrated in Figure 2-1 and detailed in Table 2-1 below.

**Figure 2-1: Noise Monitoring Locations**



**Table 2-1: Noise Monitoring Locations**

NM Location	ITM		Details
	X	Y	
NM1	567545	574074	Located onsite adjacent to Redforge Road.
NM2	567508	574091	Located onsite in the northwest corner of the Site.
NM3a	567531	573988	Located offsite adjacent to the southern boundary of the Site. This location was altered due to restrictions regarding access.
NM3b	567543	574017	Located onsite along the southern boundary of the Site.
Spot 1	567706	573961	Located east of railway track along Middle Dublin Hill.

Sound measurements were carried out utilising the following equipment:

- B&K Type 2250 Audio Acoustic Hand-held Analyser SLM, a Type 1 SLM equipped with Frequency Analysis Software.

The SLM were calibrated prior to and following the measurement periods using:

- Bruel and Kjaer sound level calibrator Type 4231.

The SLM was laboratory calibrated within the previous 24 months and the field calibrator was laboratory calibrated within the previous 12 months as recommended by the manufacturer. Calibration certificates for the SLM and field calibrator and are available upon request.

The SLM was set to measure sound in the A-weighted network and with a fast (F) sampling interval, unless otherwise stated, for broadband parameters. A-weighted fast sampling is utilised to better replicate human hearing response to sound.

In addition to broadband data, 1/3 octave frequencies were measured unweighted, defined as 'Z-weighting' within the software system, to enable an assessment for tonality.

Wind speed and temperature was measured during the survey using a portable anemometer, a Kestrel 2500.

## 2.4 Impact Assessment

This report looks at the following key aspects of the proposed development:

- The potential for noise impact during construction;
- The potential for noise impact from the operation of the proposed development on existing or other known future residents/developments in the locality; and,
- The suitability of the Site for use as a residential and residential amenity area by future residents.

The methodologies used for each of these key stages are presented below.

### 2.4.1 Construction Assessment

Construction stage noise will be assessed utilising the British Standard BS5228-1, which is designed for the assessment of noise arising from construction and open sites.

This standard identifies a methodology (the ABC method, section E.3.2 of standard) for assigning construction noise limits at Noise Sensitive Receptors (NSRs) based upon the existing ambient noise levels. An excerpt detailing the ABC method is shown in Table 2-2.

**Table 2-2: BS5228 ABC Method for assessing Construction Noise Impact**

Assessment category and threshold value period (L <sub>Aeq</sub> )	Threshold value, in decibels (dB)		
	Category A <sup>A)</sup>	Category B <sup>B)</sup>	Category C <sup>C)</sup>
Night-time (23:00-07:00)	45	50	55
Evening and weekends <sup>D)</sup>	55	60	65
Daytime (07:00-19:00) and Saturday (07:00-13:00)	65	70	75
<b>Note 1</b>	A significant effect has been deemed to occur if the total L <sub>Aeq</sub> noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.		
<b>Note 2</b>	If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L <sub>Aeq</sub> noise level for the period increases by more than 3dB due to construction activity.		
<b>Note 3</b>	Applied to all residential receptors only.		
<b>A)</b>	Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.		
<b>B)</b>	Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.		
<b>C)</b>	Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.		
<b>D)</b>	19:00-23:00 weekdays, 13:00-23:00 Saturday and 07:00-23:00 Sunday.		

This method requires an understanding of the receiving environmental at NSRs to allocate suitable construction noise limits.

## 2.4.2 Operational Assessment

The predicted operational noise of the proposed development was determined utilising:

- ISO 1996 Part 2 2017 Acoustics — Description, measurement and assessment of environmental noise — Part 2: Determination of sound pressure levels [9];
- ISO 9613-2:1996 Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation [6]; and,
- British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites which was utilised for the screening effects of a barrier [11].

## Cork City Development Plan

The current Cork City Development Plan 2015-2021 states:

Objective 12.21 Noise Levels in Developments

*'To require all developments to be designed and operated in a manner that will minimize and contain noise levels, Where appropriate, the City Council shall apply conditions on new developments / uses that restrict noise emissions and hours of operation.....or conditions on noise sensitive developments / uses to mitigate the effects of existing noise levels.'*

## 2.4.3 Site Suitability & Acoustic Design

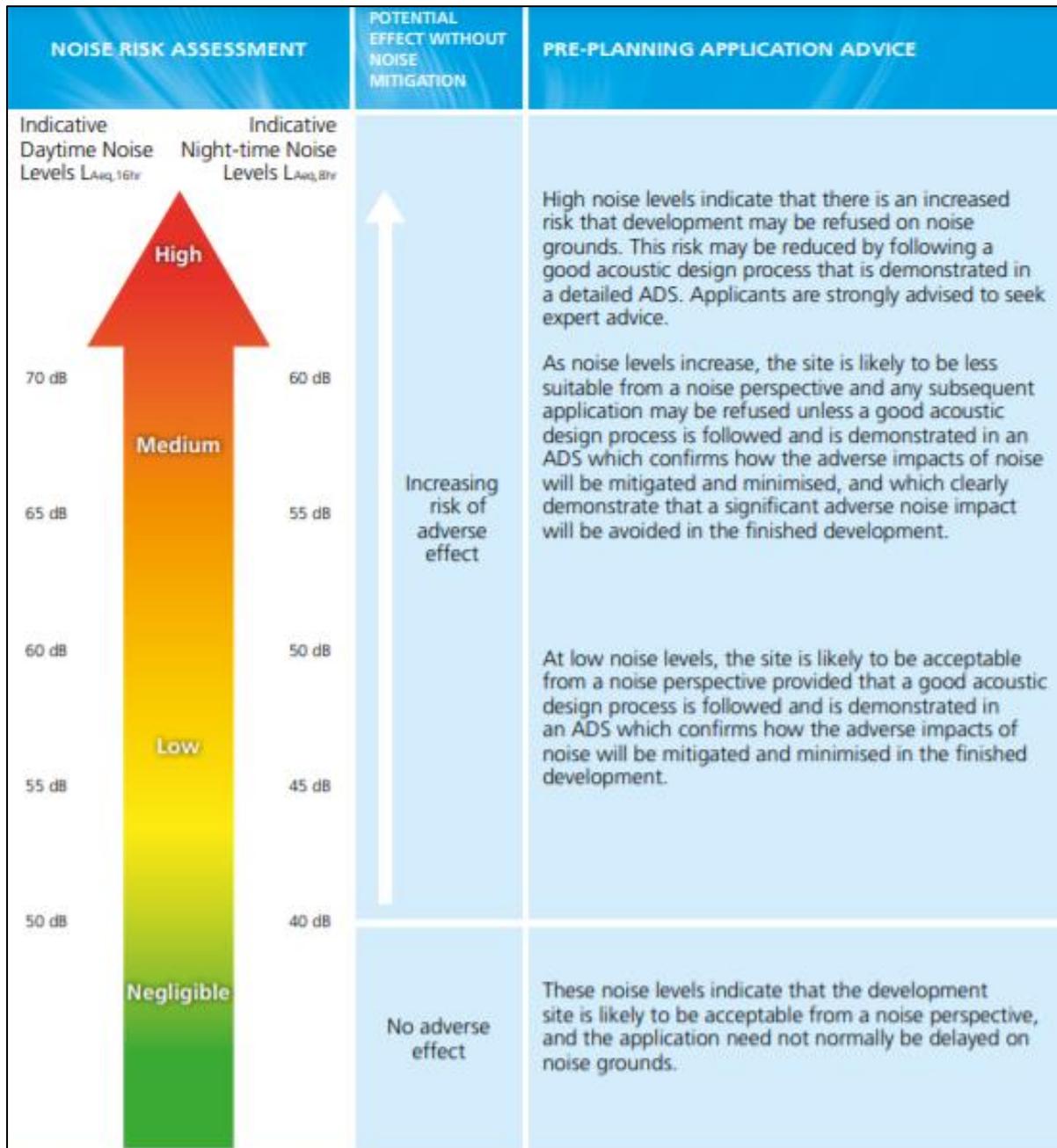
The ProPG provides guidance to Local Authorities to minimise impacts of noise on proposed residential developments, refer to Figure 2-2.

The two sequential stages of the ProPG's overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.

The internal ambient criteria provided in BS8233 is detailed in Table 2-3 below and is recommended with ProPG for the setting of acceptable in-door comfort levels.

Figure 2-2: ProPG Stage 1 Noise Risk Assessment



**Figure 1 Notes:**

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
- $L_{Aeq,16hr}$  is for daytime 0700 – 2300,  $L_{Aeq,8hr}$  is for night-time 2300 – 0700.
- An indication that there may be more than 10 noise events at night (2300 – 0700) with  $L_{Amax,F} > 60$  dB means the site should not be regarded as negligible risk.

ProPG defines the three risk categories as:

**Negligible Risk:** These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

**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 is demonstrated in an Acoustic Design Statement (ADS) which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

**Medium Risk:** As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

With regards to the Stage 1 assessment ProPG states:

*“It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker”.*

Pro PG notes, for Medium risk sites that:

*“As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.”*

Stage 2 details four key elements to be undertaken in parallel:

- Element 1 - demonstrating a “Good Acoustic Design Process” avoiding “unreasonable” and preventing “unacceptable” acoustic conditions;
- Element 2 - observing “Internal Noise Level Guidelines”;
- Element 3 - undertaking an “External Amenity Area Noise Assessment”;
- Element 4 - consideration of “Other Relevant Issues”.

## 2.4.4 BS8233 Guidance

ProPG considers the guidance provided within BS 8233:2014 to be suitable for the assessment of internal noise levels, refer to Table 2-3.

**Table 2-3: Internal Ambient Criteria of BS8233**

Activity	Location	Day (07:00 to 23:00)	Night (23:00 to 07:00)
Resting	Living Room	35dB LAeq,16 hr	~
Dining	Dining Room/Area	40dB LAeq,16 hr	~
Sleeping	Bedroom	35dB LAeq,16 hr	30dB* LAeq,8 hr

\*ProPG states 45dB LA<sub>Fmax</sub> more than 10 times a night as an additional parameter

ProPG states all dwellings should be provided with an amenity area (private, communal, or public) with levels below the WHO/BS8233 guidelines for noise nuisance.

In cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, ProPG states a relaxation of the internal  $L_{Aeq}$  values presented in Table 2-3, by up to 5 dB can still provide reasonable internal conditions.

### 3 ACOUSTIC CHARACTERISATION AND STAGE 1 – NOISE RISK ASSESSMENT

#### 3.1 Proposed Development

The Proposed Development will consist of the following elements:

- The demolition of existing structures on site including a single storey building, pump island canopy, 4 no. fuel pumps and the decommissioning/removal of 4 no. underground fuel tanks; and
- The construction of 114 no. Build to Rent apartments (comprising a mix of 1 and 2 bed apartments) in 2 no. blocks, ranging in height from 4 to 9 storeys;
- Residential amenity facilities including a reception, residents gym, lounge area and shared workspace;
- The provision of landscaping and amenity areas including an enclosed courtyard and 1 no. rooftop garden;
- The provision of public realm improvements on Redforge Road including widened footpaths and pavement improvements, pedestrian crossing, tree planting, raised tables/planters and seating areas; and
- All associated ancillary development including pedestrian/cyclist facilities, lighting, drainage, boundary treatments, bin and bicycle storage, ESB Sub-station and plant at ground floor level.
- No car parking is provided within the Proposed Development.

Figures 3-1 to Figure 3-5 below shows the Site Layout of the proposed development.

**Figure 3-1: Proposed Development Site Elevation, extract Drawing A01-03**



**Figure 3-2: Proposed Development Site Layout Ground Floor, Extract Drawing A01-01**



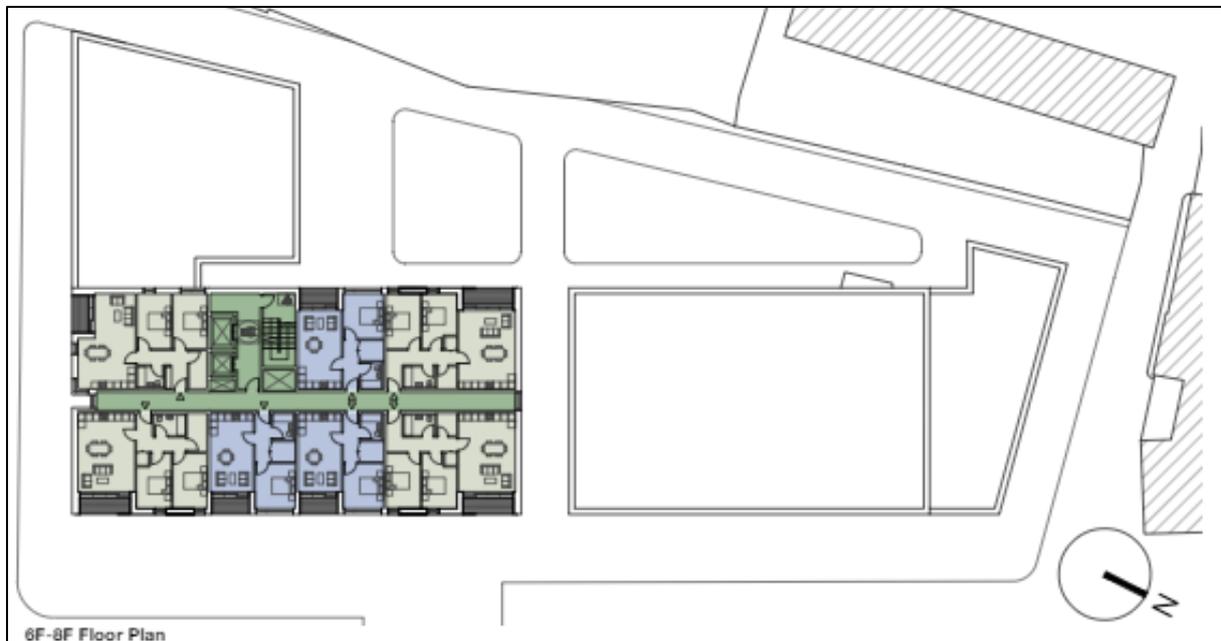
**Figure 3-3: Proposed Development Site Layout 1<sup>st</sup> -3<sup>rd</sup> Floor, Extract Drawing A01-01**



**Figure 3-4: Proposed Development Site Layout 4<sup>th</sup>– 5<sup>th</sup> Floor, Extract Drawing A01-01**



**Figure 3-5: Proposed Development Site Layout 6<sup>th</sup>–8<sup>th</sup> Floor, Extract Drawing A01-01**



## 3.2 Baseline Noise Survey

### 3.2.1 Weather Conditions

The prevailing weather conditions at the time of measurement were noted and recorded in the survey report. A portable anemometer (Kestrel 2500) was used to record wind speed before, during and after the noise survey periods.

Weather conditions on the 11<sup>th</sup> May 2021 were warm (ca.12°C) during the day and cool during the night-time period. The wind conditions for the day were Light Breeze (1.6-3.3m/s) to Gentle Breeze (3.4-5.5m/s) with occasional short duration gusts of 5-8m/s occurring during monitoring. Wind gust frequencies decreased in the night-time period compared to the daytime.

Onsite weather observations are supplemented by the closest Met Éireann weather station (Cork Airport, ca.11km southwest) report, summarised in Table 3-1.

**Table 3-1: Summary of Weather Conditions at Cork Airport Synoptic Station**

Date	Rainfall (mm)	Temp Max (°C)	Temp Min (°C)	Grass Min Temp (°C)	Mean Wind Speed (knots)	Maximum gusts (knots)
11/05/2021	5.7	12.6	5.9	4.4	10.2 (5.2m/s)	~

Hourly data generated by Met Éireann from Cork Airport is shown in Appendix B, these graphs show the hour-by-hour changes in the weather conditions at the Cork Airport synoptic station over the day.

The summary of the monitoring results for the daytime and night-time monitoring events are presented in Section 3.3.2. below

### 3.2.2 Baseline Acoustic Results

Tables 3-2 and 3-3 below detail the baseline acoustic survey results for the daytime and night-time periods. 1/3<sup>rd</sup> Octave Charts are available upon request.

**Table 3-2: Baseline Daytime Acoustic Results 11<sup>th</sup> May 2021**

	NM Location	Start Time	Duration	L <sub>Aeq,T</sub>	L <sub>A10,T</sub>	L <sub>A90,T</sub>	L <sub>AFmax</sub>	Commentary
Day	NM1	11:06	00:30:00	67	71	54	82	Wind speed 4-5m/s. Occasional gusts of 8m/s. Birdsong and bird call audible. Pedestrian's walking/talking audible. Vehicles within service station utilising pumps and car wash occasionally audible. Occasional dog barking to the north audible. Traffic on Redforge Road audible and dominant. Distant traffic audible. Train passing on railway to the east audible.
		11:37	00:30:00	67	71	52	89	Run 2 – distant church bell (12:00) audible. Peak events (L <sub>AFmax</sub> ) due to vehicles passing near the SLM. <u>Traffic Count (10 minutes) – Redforge Road.</u> Run 1 - 87 vehicles (including cars, buses, and HGVs).
	NM2	12:10	00:30:00	58	60	51	81	Wind speed 4-5m/s. Occasional gusts of 8m/s. Tree rustle with wind gusts audible. Birdsong and bird call audible. Pedestrian's walking/talking audible. Vehicles within service station utilising pumps and car wash occasionally audible. Occasional dog barking to the north audible.
		12:40	00:30:00	57	59	51	80	Traffic on Redforge Road audible and dominant. Distant traffic audible. Train passing on railway to the east audible. Extraction fan from the service station audible. Washing machines/dryers audible. Peak events (L <sub>AFmax</sub> ) due to vehicles passing near the SLM.

	NM Location	Start Time	Duration	L <sub>Aeq,T</sub>	L <sub>A10,T</sub>	L <sub>A90,T</sub>	L <sub>AFmax</sub>	Commentary
	NM3a	13:41	00:15:00	65	68	56	83	<p>Wind speed 4-5m/s. Occasional gusts of 8m/s. Tree rustle with wind gusts audible. Flag flapping with wind gusts audible.</p> <p>Birdsong and bird call audible. Pedestrian's walking/talking audible. Vehicles within service station utilising pumps and car wash occasionally audible.</p> <p>Traffic on Redforge Road audible and dominant. Distant traffic audible. Train passing on railway to the east audible.</p> <p>Cars entering and passing over manhole cover intermittently audible.</p> <p>Hum from shopping centre plant audible. Trolley rattle to the west occasionally audible.</p> <p>Peak events (L<sub>AFmax</sub>) due to vehicles passing near the SLM.</p> <p><u>Traffic Count (10 minutes) – Redforge Road.</u></p> <p>Run 1 - 33 vehicles (including cars, buses and HGVs).</p>
	NM3b	15:02	00:30:00	61	65	52	81	<p>Wind speed 4-5m/s. Occasional gusts of 8m/s. Tree rustle with wind gusts audible. Flag flapping with wind gusts audible.</p> <p>Birdsong and bird call audible. Pedestrian's walking/talking audible. Vehicles within service station utilising pumps and car wash occasionally audible.</p> <p>Traffic on Redforge Road audible and dominant. Distant traffic audible. Train passing on railway to the east audible.</p> <p>Cars entering and passing over manhole cover intermittently audible.</p> <p>Hum from shopping centre plant audible. Trolley rattle to the west occasionally audible.</p>
		15:47	00:15:00	61	65	51	75	<p>Run 1 – child crying audible. Train horn sounded (15:27)</p> <p>Peak events (L<sub>AFmax</sub>) due to vehicles passing near the SLM.</p> <p><u>Traffic Count (10 minutes) – Redforge Road.</u></p> <p>Run 1 -71 vehicles (including cars, buses and HGVs)</p>

**Table 3-3: Baseline Night-time Acoustic Results 11<sup>th</sup> May 2021**

	NM Location	Start Time	Duration	L <sub>Aeq,T</sub>	L <sub>A10,T</sub>	L <sub>A90,T</sub>	L <sub>AFmax</sub>	Commentary
Night	NM1	22:48	15:00	59	56	43	76	Wind speed 1-3m/s. Traffic on Redforge Road audible and dominant. Distant traffic audible. Cars entering and passing over manhole cover intermittently audible. Hum from shopping centre plant audible.
		23:38	15:00	54	42	36	76	Peak events (L <sub>AFmax</sub> ) due to vehicles passing near the SLM. <u>Traffic Count (15 minutes) – Redforge Road.</u> Run 1 - 7 vehicles.
	NM2	22:05	15:00	53	57	45	74	Wind speed 1-3m/s. Slight drizzle at start of survey. Vehicles within service station utilising pumps occasionally audible. Occasional dog barking to the north audible. Traffic on Redforge Road audible and dominant. Distant traffic audible.
		22:30	15:00	51	54	46	67	Extraction fan from the service station audible. Peak events (L <sub>AFmax</sub> ) due to vehicles passing near the SLM. <u>Traffic Count (10 minutes) – Redforge Road.</u> Run 1 - 11 vehicles (including cars, buses and HGVs). Run 2 - 10 vehicles (including cars, buses and motorbike).
	NM3b	23:05	15:00	49	47	42	68	Wind speed 1.5-3m/s. Occasional light drizzle. Vehicles within service station utilising pumps occasionally audible. Traffic on Redforge Road audible and dominant. Distant traffic audible. Cars entering and passing over manhole cover intermittently audible.
		23:21	15:00	53	50	44	80	Hum from shopping centre plant audible. Peak events (L <sub>AFmax</sub> ) due to vehicles passing in close proximity to the SLM.

In addition to the above a spot measurement was taken east of the railway line to capture the noise characteristics of a passing train, refer to Table 3-4 below.

**Table 3-4: Spot Measurement Result**

NM Location	Start Time	Duration	L <sub>Aeq,15min</sub>	L <sub>A10,15min</sub>	L <sub>A90, 15min</sub>	L <sub>AFmax</sub>	Commentary
Spot 1	16:27	05:00	67	69	53	82	Wind speed 3.5-5m/s. Occasional gust of 5-7m/s Traffic on adjacent road audible. Train passing at 16:28 peak event. Overhead plane audible. Strimmer from dwelling to the east audible.

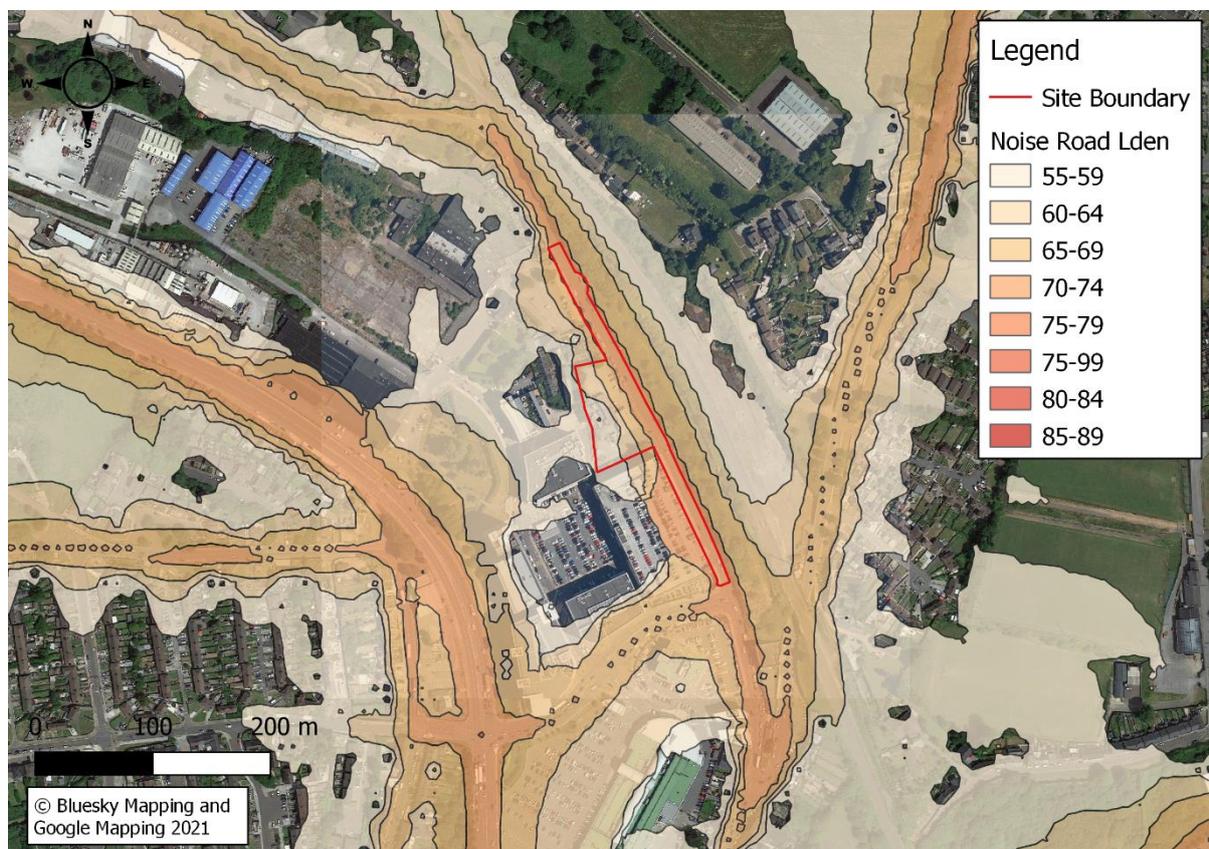
### 3.3 Strategic Noise Mapping

The following strategic noise maps [14] were reviewed to assess the baseline noise environment:

- Round 3: Road Noise Maps;
- Round 3: Airport Noise Maps; and
- Round 3: Rail Noise Maps.

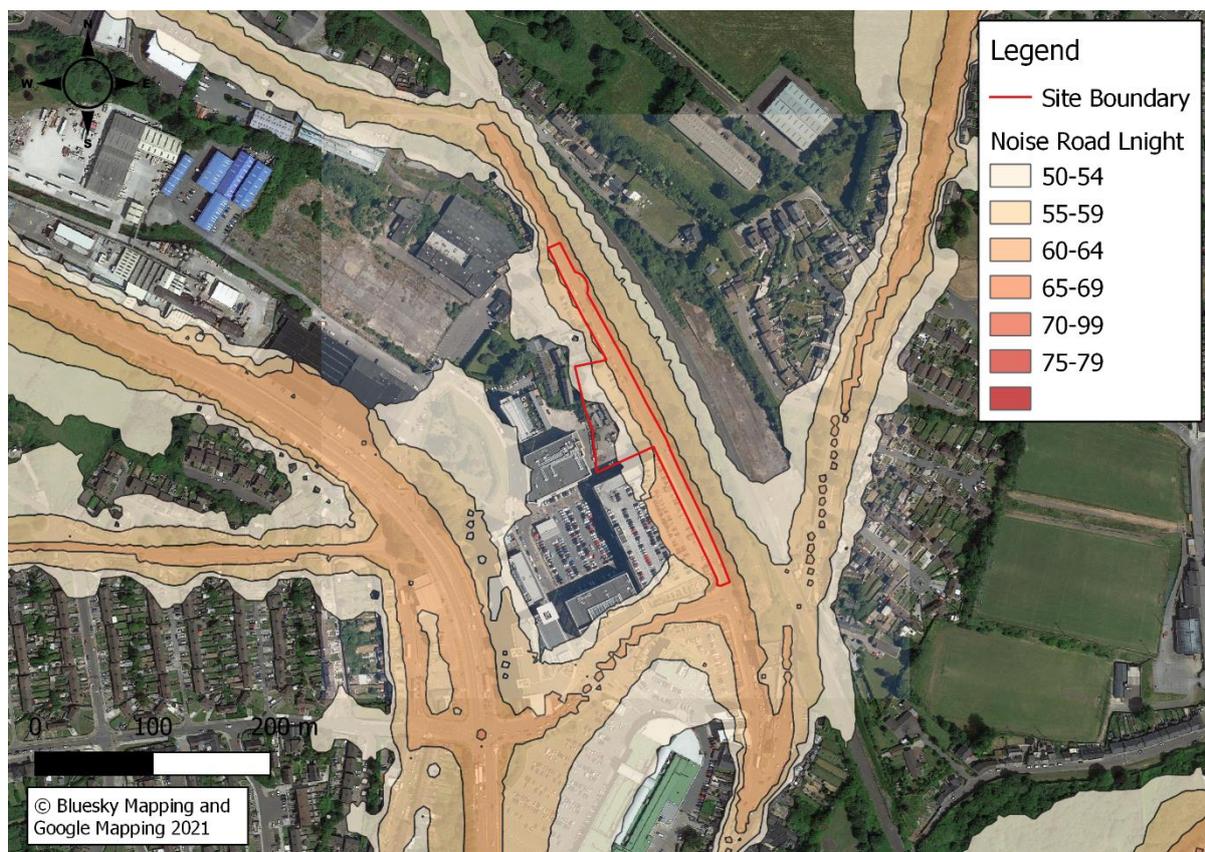
Figures 3-6 to 3-8 below show Round 3 Road and Rail ( $L_{DEN}$  and  $L_{night}$ ) maps detailing the overall day, evening and night-time  $L_{DEN}$  maps and the night-time  $L_{night}$  maps for both rail and road. Airport impacts on the locality were discounted as the associated noise contours were >4km from the Site.

**Figure 3-6: Round 3, Road Noise  $L_{DEN}$**



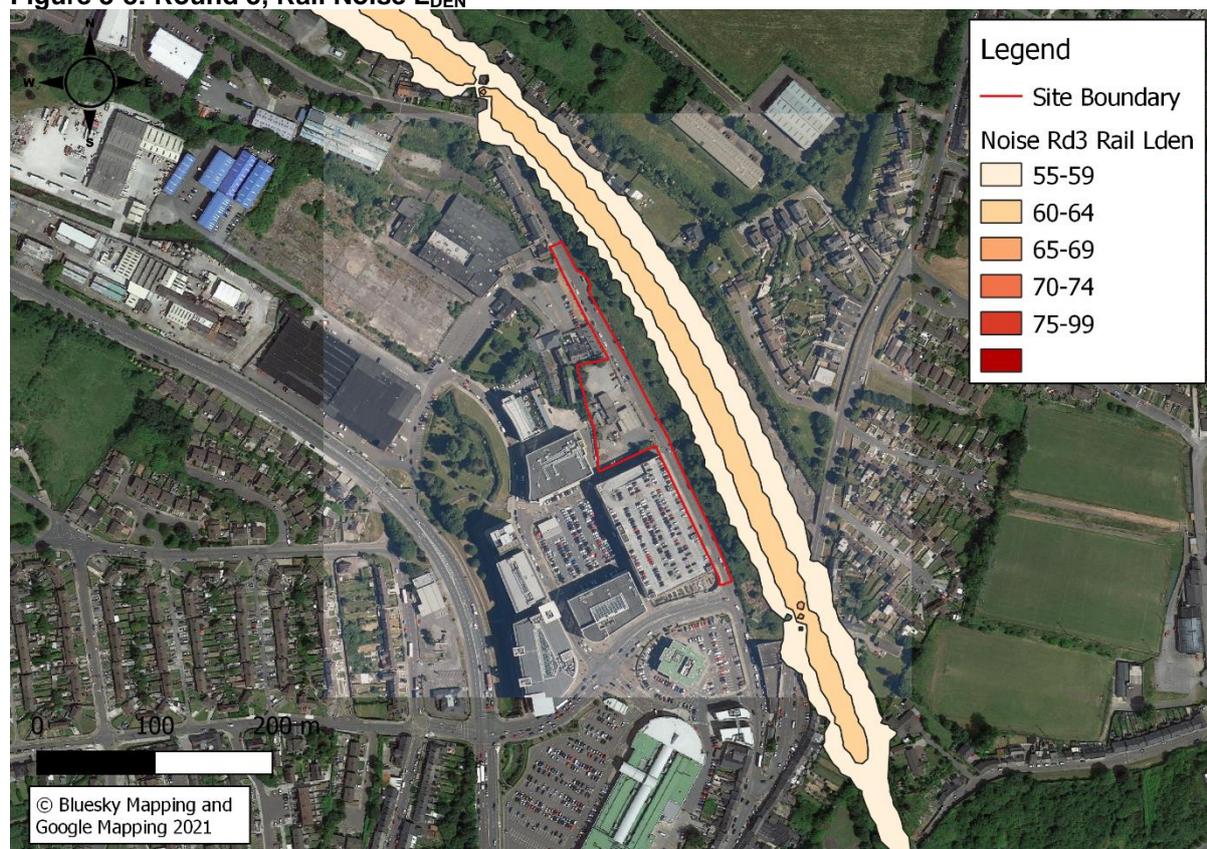
The road noise  $L_{DEN}$  ranges from 55dB to 79dB across the Site, decreasing with distance from the adjacent Redforge Road to the east and the Commons Road to the west.

Figure 3-7: Round 3, Road Noise  $L_{\text{night}}$



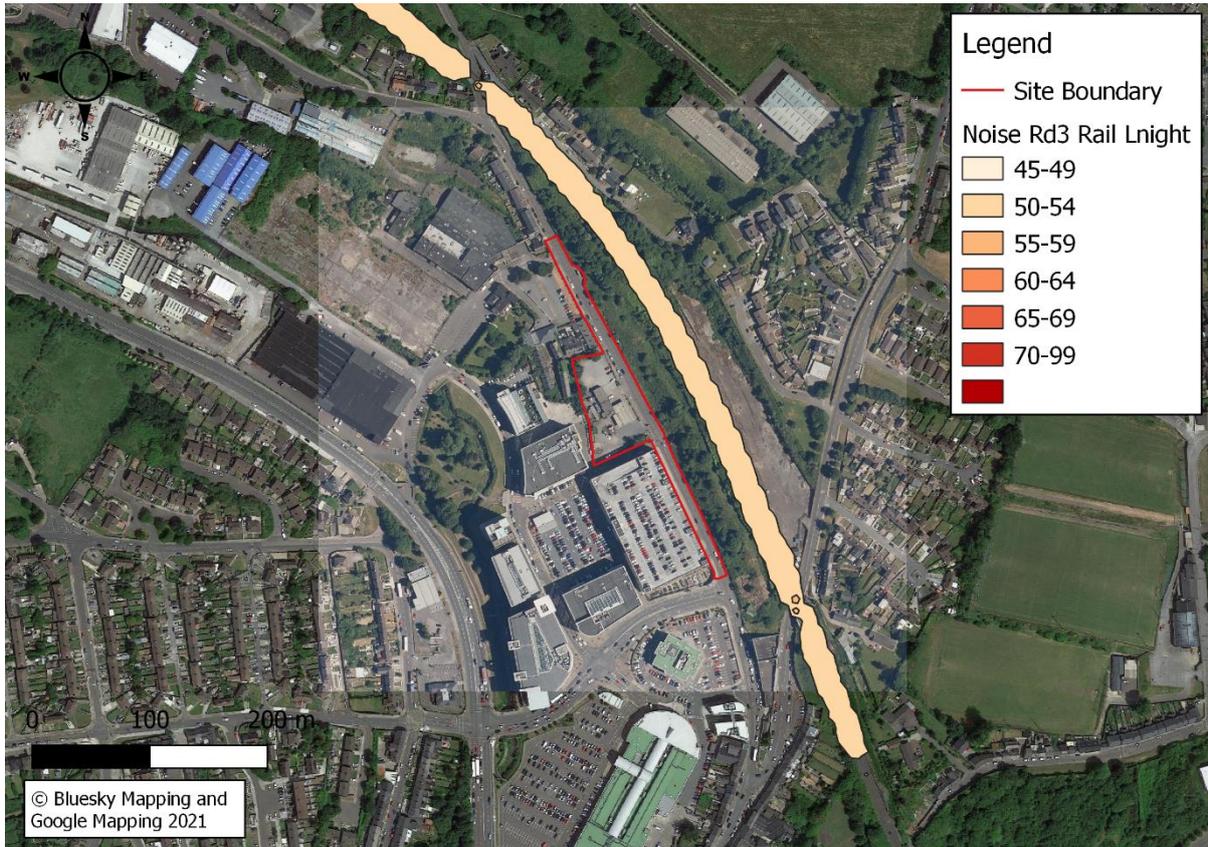
The road noise  $L_{\text{night}}$  ranges from 50dB to 64dB across the Site, decreasing with increasing distance from the adjacent Redforge Road.

Figure 3-8: Round 3, Rail Noise  $L_{DEN}$



The rail noise  $L_{DEN}$  contour of 55dB - 59dB is less than 30m to the east of the Site.

Figure 3-9: Round 3, Rail Noise  $L_{night}$



The rail noise  $L_{night}$  contour of 50dB - 54dB is less than 45m to the east of the Site.

### 3.4 Future Noise Environment

There will be a reduction in general noise associated with the Site's current occupier, a service station and car washing facility, as a result of the proposed development. There are no major changes to the local infrastructure identified that are likely to alter the future noise environment. Road traffic noise is not expected to change significantly into the future, with no parking proposed within the design.

### 3.5 ProPG Guidance

#### 3.5.1 Stage 1 – Initial Noise Risk Assessment

The current noise levels experienced across the Site following a baseline survey and review of the Strategic Noise Mapping presented in Sections 3.3 and 3.4 are summarised in Table 3-5 below.

**Table 3-5: Summary of Noise Levels Across the Site**

Noise Source	NM1 (dB)	NM2 (dB)	NM3a (dB)	NM3b (dB)
Daytime (8am to 10pm)				
Baseline Monitoring $L_{Aeq,T}$	67	57-58	65	61
Baseline Monitoring $L_{A90,T}$	52-54	51	56	51-52
Night-time (10pm to 8am)				
Baseline Monitoring $L_{Aeq,T}$	54-59	51-53	-	49-53
Baseline Monitoring $L_{A90,T}$	36-43	45-46		42-44
Round 3, Road Noise - $L_{DEN}$ dB	55-79			
Round 3, Road Noise – $L_{night}$ dB	50-64			
Round 3, Rail Noise – $L_{DEN}$ dB				
Round 3, Rail Noise – $L_{night}$ dB				

The initial site noise risk assessment has determined that the level of risk to the Site is:

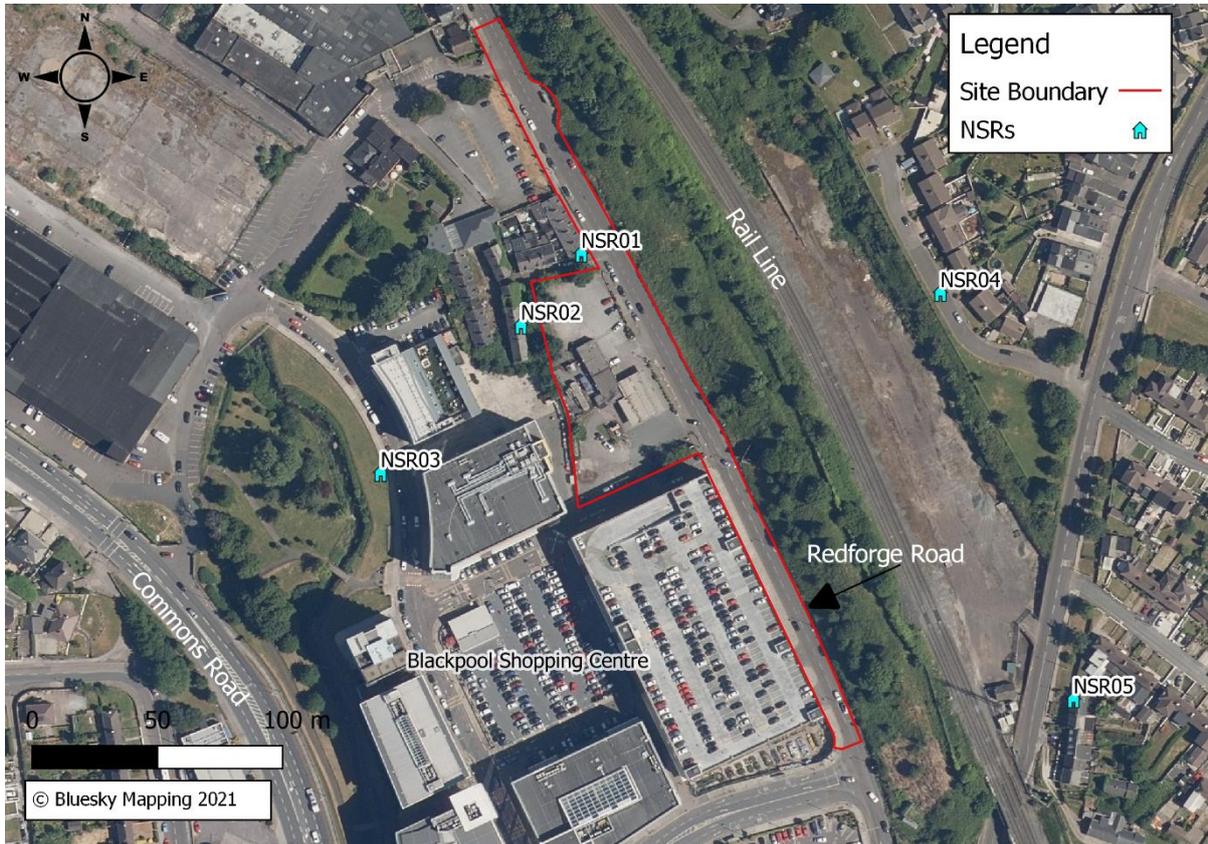
- **Medium Risk**, refer to Section 2.4.3 above.

An Acoustic Design Strategy is required to demonstrate adverse noise impacts will be avoided during the operational phase of the proposed development. Please refer to Section 5.

## 4 ACOUSTIC IMPACT

To assess potential acoustic impacts during the construction and operational stages the closest Noise Sensitive Receptors (NSRs) were selected as NSRs situated further from the Site will experience lower noise levels as distance from the Site increases., refer to Figure 4-1 and Table 4-1 below.

**Figure 4-1: Noise Sensitive Receptors (NSRs)**



**Table 4-1: Noise Sensitive Receptors**

NSRs	ITM		Description
	X	Y	
NSR 01	567527	574109	Dwellings immediately north of the Site.
NSR 02	567502	574080	Dwellings immediately west of the Site.
NSR 03	567447	574019	Amenity Area to the west of the Site.
NSR 04	567670	574093	Proxy for residents situated in The Grove / Kilbarry Cottages.
NSR 05	567723	573930	Proxy for residents situated along Middle Hill Dublin Road.
NSR 06	567641	573802	Bowler House / Blackpool Library

NSRs 01 and 02 are approximately 5m or less from the Site boundary.

## 4.1 Construction Phase

Utilising Table 2-2 (refer to Section 2.4.1), the baseline results and strategic noise maps the Site is classified as Category B, therefore the following threshold values will apply at NSRs:

- Daytime (07:00-19:00) and Saturday (07:00-13:00) 70dB
- Evening (19:00 – 23:00) and weekends (07:00 – 23:00 Sunday) 60dB
- Night-time (23:00-07:00) 50dB

Demolition and construction noise will arise where heavy machinery will be in use to move soils, site levelling, piling works and the creation of infrastructure onsite. Much of the material encountered during these works will likely be removed by excavators and bulldozers. This noise assessment was based on the notable noise emission sources anticipated during the construction works are outlined in Table 4-2 below.

Construction Phase timelines will be as follows:

- 8:00am to 6:00pm Monday to Friday; and,
- 8:00am to 2:00pm on Saturdays.
- No work on Sundays or public holidays.

The movement of workers to and from the Site was not assessed within this report. All worker movements will likely peak during the hours of 7:00am to 8:30am in the morning and 6:30pm to 7:00pm in the evening with associated vehicle movement on the public road network. These movements will be in keeping with local commercial employee traffic and are therefore not deemed likely to impact on local road noise.

This Noise Impact Assessment has utilised generic sound pressure values from the BS5228 [11] standard as specific plant equipment is currently unknown. This is deemed a worst-case scenario as newer plant released to the market implement tighter controls on noise emissions.

The following standard noise equation, to assess the sound pressure ( $L_{w2}$ ) at a distance  $r_2$ , from a known sound pressure ( $L_{w1}$ ) at distance  $r_1$  was used to predict noise values at NSRs:

$$L_{w2} = L_{w1} - 20 \log_{10} \left( \frac{r_2}{r_1} \right)$$

The distances from receptors to the construction area were calculated from the closest façade of an NSR to the Proposed Development concrete pavement edge. A simplified barrier assessment for partially obscuring a source emission to receptor was completed in accordance with the BS 5228-1:2009 – Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.

The assessment incorporated screening between the Site and NSRs, i.e. embankments with mature hedging or walls with source still visible (-5dB).

Post planning and prior to the commencement of the construction phase works the appointed Contractor will be required develop a Construction Environmental Management Plan (CEMP) outlining the methods to control noise emissions onsite. As no Contractor has been assigned and no commencement date scheduled, the following information detailed in Tables 4-2 and 4-3 are typical values associated with conventional methods and equipment for the demolition and construction stages.

### 4.1.1 Demolition Stage

**Table 4-2: Typical Demolition Stage Predicted Noise Emissions**

Plant	Sound Pressure at 10m $L_{Aeq,T}$ , dB
Truck with lifting boom	77
Mobile Crane (50t)	67
Cutting Concrete	79
Hammering	79
Drilling	76

### 4.1.2 Construction Stage

**Table 4-3: Typical Construction Stage Predicted Noise Emissions**

	Plant	Sound Pressure at 10m $L_{Aeq,T}$ , dB
Site Clearance	Truck with lifting boom	77
	Lorry	70
	Wheeled backhoe loader	67
	Fencing hammer piling	77
	Tracked Excavator (site clearance) x2	81
	Dozer x 2	78
	Piling (Continuous Flight Auger)	80
Site Development	Diesel Generator	59
	Concrete pump + cement mixer truck (discharging)	67
	Poker Vibrator	78
	Mobile Crane (50t)	67
	Cutting Concrete	79
	Vibratory Compactor	82
	Asphalt Paver	75
	Hammering	79
	Welder	73
Drilling	76	

To reduce the possibility of any offsite breach of the daytime limit of  $L_{Aeq,1hour}$  70dB at NSRs during the construction phase mitigation measures will be incorporated into the CEMP, typical mitigation measures are detailed in Section 4.1.4. below.

### 4.1.3 Construction Phase Vibration

The selection of a continuous flight auger during the piling works will ensure the proposed developments will not cause vibration that can give rise to structural or cosmetic damage.

#### 4.1.4 Construction Phase Mitigation Measures

As best practice the following noise and vibration mitigation measures will be incorporated into the CEMP:

- A noise complaint procedure shall be implemented;
- A solid and continuous hoarding shall be erected across the entire Site perimeter;
- Onsite vehicles/equipment shall be throttled down/switched off when not in use;
- Selection of low noise rated machinery and equipment;
- Use of acoustic enclosures/screens where applicable;
- Isolation of vibrational sources such as pumps/compressors where required;
- Cut off trenches to isolate vibration transmission path installed where required; and
- Noise compliance monitoring is undertaken.

#### 4.2 Operational Phase

Operational noise sources associated with the proposed development will consist of:

- Retail Unit;
- Substation;
- Switch Room;
- Plant Room; and
- Individual Air to Waste Units located on associated balconies.

The Substation, Switch and Plant rooms are located on the ground floor of Block A along the southern boundary. External openings and doors from these rooms will be enclosed with acoustic louvred vents/enclosures or similar to ensure no adverse impact from these locations occur in external areas and onsite living and bedroom spaces or offsite NSRs.

The impact of external traffic and rail noise to residents will be reduced by the orientation of balconies away from Redforge Road to the east where possible. Balconies which face Redforge Road are setback to reduce the impact of traffic and rail noise on private balconies on the eastern façades of Blocks A and B.

Breakout noise emissions associated with the Plant, Substation and Switch Rooms are predicted to be significantly below (i.e. more than 10dB difference) the night-time 59dB  $L_{Aeq,T}$  value utilised in determining the buildings sound reduction from the external to internal environments, refer to Section 4.3 below.

Air to water units such as a Diakin RXYMQ4AV4A or similar typically have a sound pressure level of 60dB at 1m. An air to water unit will be located on each apartment's balcony. The noise level associated with the air to water unit will be similar to the noise levels ( $L_{Aeq,T}$ ) experienced onsite during the daytime and night-time.

It is reasonable to expect that these units will operate during the night-time period and will be positioned to ensure the orientation of the units are away from glazing and/or bedroom windows of onsite receptors (future residents) and offsite NSRs to the north and west.

Offsite Plant Compound to the west is approximately on an elevation similar to the Proposed Development's 6<sup>th</sup> floor. Therefore, noise emissions from these units are likely audible at the 6<sup>th</sup> Floor balconies and above. Given the likely noise emission levels from these units it is predicted no adverse impact will occur.

The movement of delivery/ service vehicles and employees to the proposed development during the operational phase have not been assessed as these are deemed insignificant.

#### **4.2.1 Sound Generated within External Amenity Areas and Resident Movement**

Within the proposed development, the movement of people within the Site will not be the predominant noise arising due to surrounding acoustic environment such as traffic noise from Redforge Road and rail noise from the adjacent railway line.

Although congregation of residents is likely at external amenity areas and entrance/egress point, the associated noise will typically be similar to the urban cityscape. Appropriate signage will instruct residents to respect occupiers within the vicinity of the proposed development when utilising external amenity areas specifically at night-time.

Any urban development may be subject to anti-social behaviour, including raised voices or the movement of vehicles with modified exhausts. Such activity is currently managed through the standard law enforcement, and such measures will be utilised at this proposed development in the event such activities arise. Site management will prevent onsite anti-social behaviour arising from residents utilising signed contract agreements with future residents and strict enforcement.

#### **4.3 Pro PG Stage 2 - Full Acoustic Assessment**

##### **4.3.1 Do Nothing Scenario**

The Site is zoned '4- Residential, Local Services and Institutional Uses' as per Map 4 of the CDP [12] and would likely be developed in the future. The impact of any future similar development would be similar to the impact identified within this assessment.

If the proposed development did not progress, noise levels in the vicinity of the Site would likely remain unchanged. There would also be no supplementary noise sensitive receptors in the vicinity exposed to the existing noise levels.

##### **4.3.2 Element 1: Good Acoustic Design Process**

Applicants must therefore consider all possibilities for mitigation including but not limited to:

- Checking the feasibility of relocating, or reducing noise levels from relevant sources;
- Considering options for planning the site or building layout;
- Considering the orientation of proposed building(s);
- Selecting construction types and methods for meeting building performance requirements;
- Assessing the viability of alternative solutions;
- Assessing external amenity area noise;
- Examining the effects of noise control measures on ventilation, fire regulation, health and
- Safety, cost, CDM (construction, design and management) etc.

##### **Application of Good Acoustic Design Process to the Proposed Development**

Regarding the Site's limitations and taking care not to limit the extent of the Site's footprint the principles of Good Acoustic Design have been applied to the proposed development as detailed below.

##### **Noise at Source**

The dominant noise source is offsite traffic and rail noise from the adjacent road and rail networks outside of the Site's red line boundary and therefore no mitigation to this noise source can be applied.

##### **Layout and Orientation**

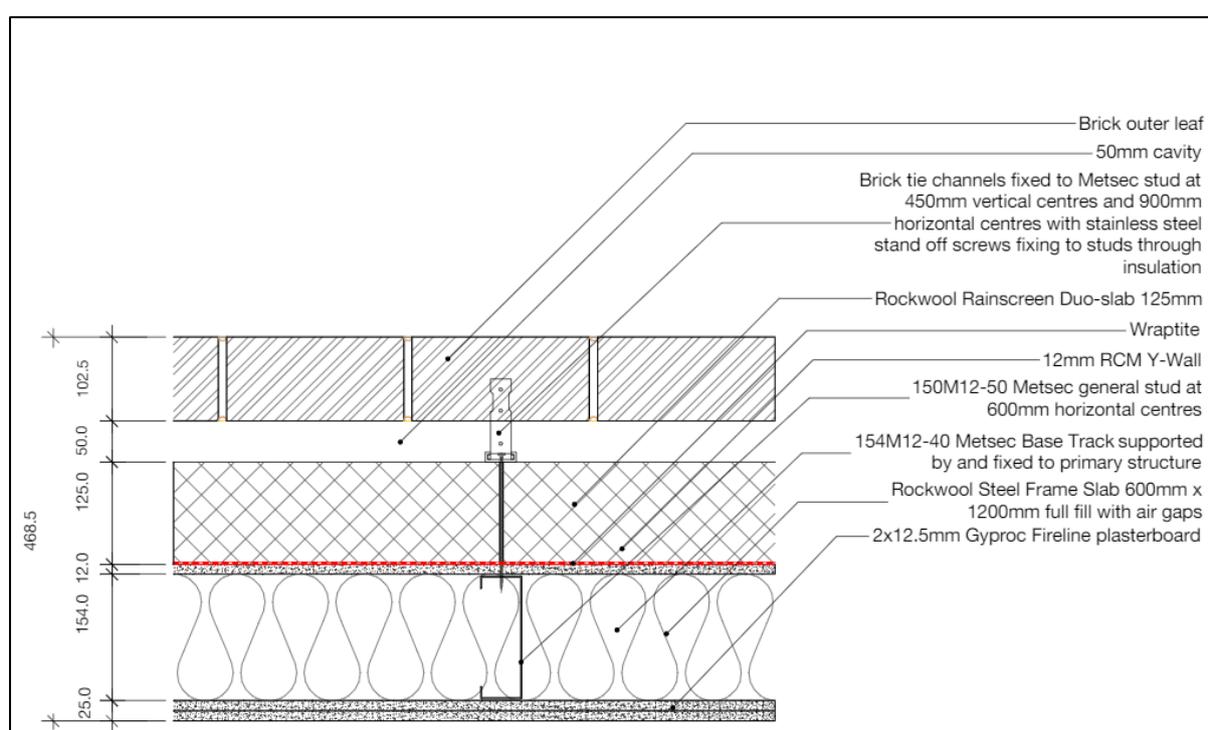
Ground floor levels are shown in Figure 3-1. The primary consideration was to ensure living accommodation was located away from the higher  $L_{DEN}$  road noise band emanating from the Redforge Road (refer to Figure 3-3) and rail noise from the adjacent rail line (Figure 3-6). This

was done by having amenity areas on the ground floor along Redforge Road and living accommodation situated on the 1<sup>st</sup> floor and above to reduce the impact of traffic noise on living spaces from the Redforge Road. Ground floor living accommodation is present in south west corner of Block B. These living quarters are furthest from the dominant noise source, traffic on the Redforge Road and rail noise on the adjacent rail line to the east.

### Construction Type

The external walls of the proposed development will be constructed using a brick façade with steel frame, and insulation. These construction types provide for good sound insulation performance. As with all construction, glazing and ventilation elements have reduced sound insulation properties compared to the wall make-up. These elements will comply with the Building Regulations with regards to sound insulation performance.

**Figure 4-2: Typical External Wall Construction**



The sound insulation performance of the glazing and ventilation systems in proximity to the Redforge Road will be upgraded as it will not be possible to achieve the internal acoustic environmental criteria outlined in Table 2-3 with the windows with traffic noise.

### External Amenity Areas

ProPG recommend that external amenity areas should not be above the range of 50-55dB  $L_{Aeq,16hour}$ . Existing noise levels across the Site currently exceed this recommended limit. The proposed development will have amenity areas to the east along Redforge Road providing a distance buffer from traffic noise and onsite receptors. To the west an amenity area will be present linking to the internal residential amenity space. This courtyard amenity area to the west linking to the internal amenity space will be shielded by traffic and rail noise due to the building and its height.

A rooftop garden will be present above the retail space on the 4<sup>th</sup> floor to the southwest of the site. The rooftop garden will have a 1.5m barrier surrounding it and will be ca. 29.1m in height which will provide a barrier effect to traffic noise on the Redforge Road. The rooftop garden will be similar elevation as the adjacent railway track.

## Alternative Solutions

A noise barrier in excess of 4m would provide noise mitigation from road noise at ground level where external amenity areas are present. However, it is not practical to create a noise barrier which would break the line of sight between the road network and these spaces. In addition, the provision of a bus stop, set down area and 1no. access point and footpaths on Redforge Road are required.

Therefore, a noise barrier was not considered due to practicality, encroachment onto Redforge Road, restriction of access and no adequate mitigation effect at height from rail noise.

## Impact of Acoustic Design on Fire, Health and Safety

The acoustic design measures such as increased distance and location of living accommodation away from the road infrastructure as practically possible, upgraded glazing and ventilation will not have any significant impact on issues related to fire and/or health and safety.

### 4.3.3 Element 2: Internal Noise Levels - BS8223 Assessment

#### Wall Construction

The estimated sound insulation rating of the proposed development's external walls and glazing are described in Table 4-4 below which provides an indicative build-up and associated sound reduction.

**Table 4-4: External Sound Insulation Rating**

Item	Sound Insulation Rating dB R'w
<b>External Wall:</b> 102.5mm brick, 50mm cavity, 125mm Duo slab or similar.	>50
<b>External Glazing:</b> Standard window arrangement with trickle vent	32
Upgraded window arrangement with trickle vents	37

To determine the estimated impact of the external noise to the proposed development the most exposed façade (south-eastern façade of Block A) was utilised as a worst-case scenario, refer to Table 4-5 below.

**Table 4-5: Assessment Summary Daytime and Night-time**

Location	Floor Level	Noise Level ( $L_{Aeq,T}$ )		Façade Reduction / Attenuation dB R'w	Predicted Noise Level in Receiving Space ( $L_{Aeq,T}$ )	
		Daytime	Night-time		Daytime (limit 35dB)	Night-time (Limit 30dB)
South-eastern Façade of Block A	First Floor	67	59	37 (upgraded windows closed)	30	25

The highest  $L_{Aeq}$  measurements recorded onsite were:

- Daytime 67dB and
- Night-time 59dB.

The upgraded external glazing sound insulation rating of 37dB R'w from the composition of the building makeup will ensure that the daytime external noise level of 67dB will be reduced to an internal level of less than 35dB and the night-time external noise level of 59dB will be reduced to an internal level of less than 30dB, which complies with the lowest criteria as defined within World Health Organisation and BS8233 guideline levels.

### **Glazing Open V Closed Windows**

External glazing incorporating trickle vents (total sound reduction of  $\geq 37$ dB) will result in an internal noise level of 30dB during the daytime and less than 30dB during the night-time when the external glazing is closed.

When windows are open, a reduction of 15dB from outside to inside is assumed [4]. This would result in an internal noise level when windows are open of ca.52dB during the daytime and ca.44dB during the night-time which exceed ProPG recommended internal  $L_{Aeq}$  levels. The key design criteria was to ensure the rooms can be comfortably lived within with the windows closed. The ability to open the windows will present a higher internal noise value, but this is an option the design cannot mitigate.

### **Ventilation**

Trickle vents will be present in all external glazing of living areas, these will be required to have a sound reduction of  $\geq 37$ dB.

Where building service vents, extraction fans, and louvres are present, they shall be acoustically rated baffle filters or similar to ensure break in from external noise to internal living areas is reduced by a minimum of 37dB. All ducting shall be installed to ensure no vibrational borne noise occurs within the building.

### **Air To Water Units**

Where air to water units are located on balconies, they will be orientated away from onsite receptor windows and glazing facades. Air to water units such as a Diakin RXYMQ4AV4A or similar typically have a sound pressure level of 60dB at 1m. An air to water unit will be located on each apartment's balcony. The noise level associated with the air to water unit will be similar to the noise levels ( $L_{Aeq,T}$ ) experienced onsite during the daytime and night-time at these facades.

### **Roof**

The typical roof makeup of approximately gravel, waterproof coating, GreenGuard and 250mm RC slab will achieve a sound reduction in excess of  $\geq 37$ dB, refer to Figure 4-3 below.



Figure 4-4: Ground Level External Amenity Areas/Spaces

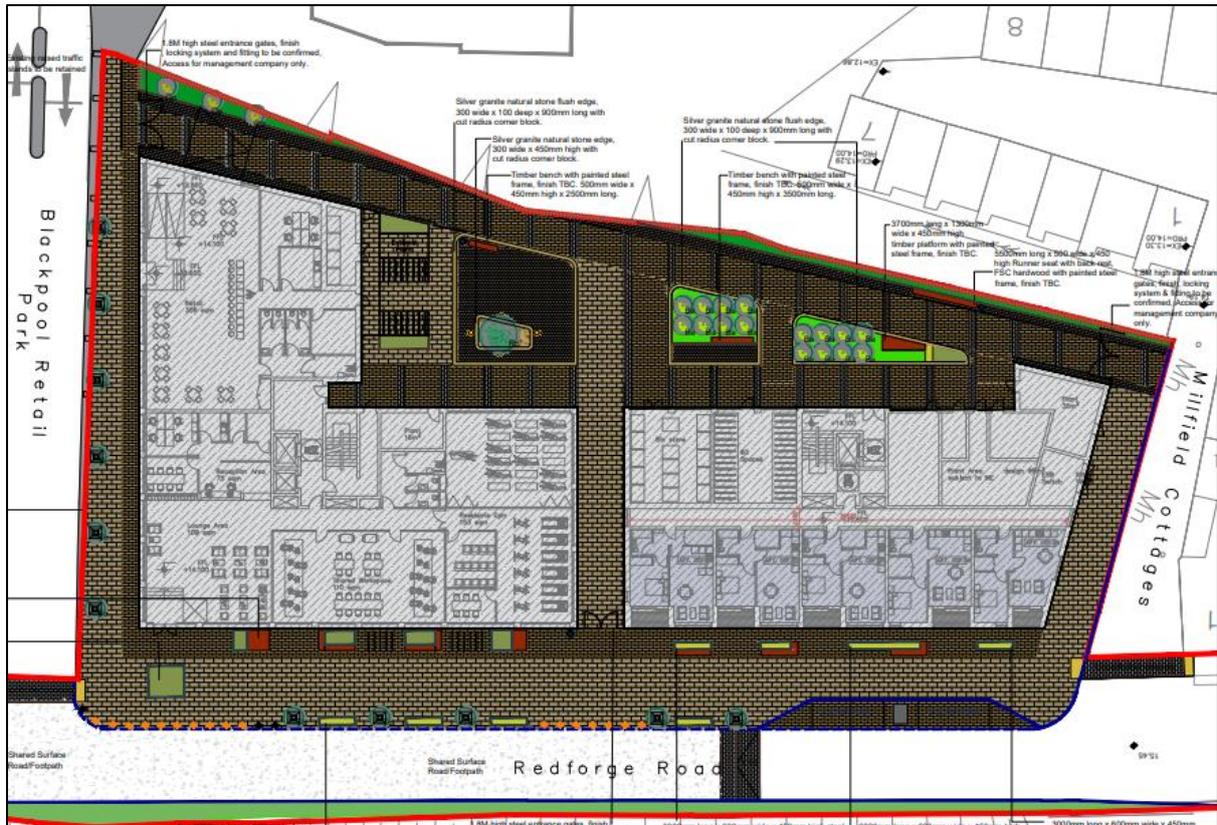
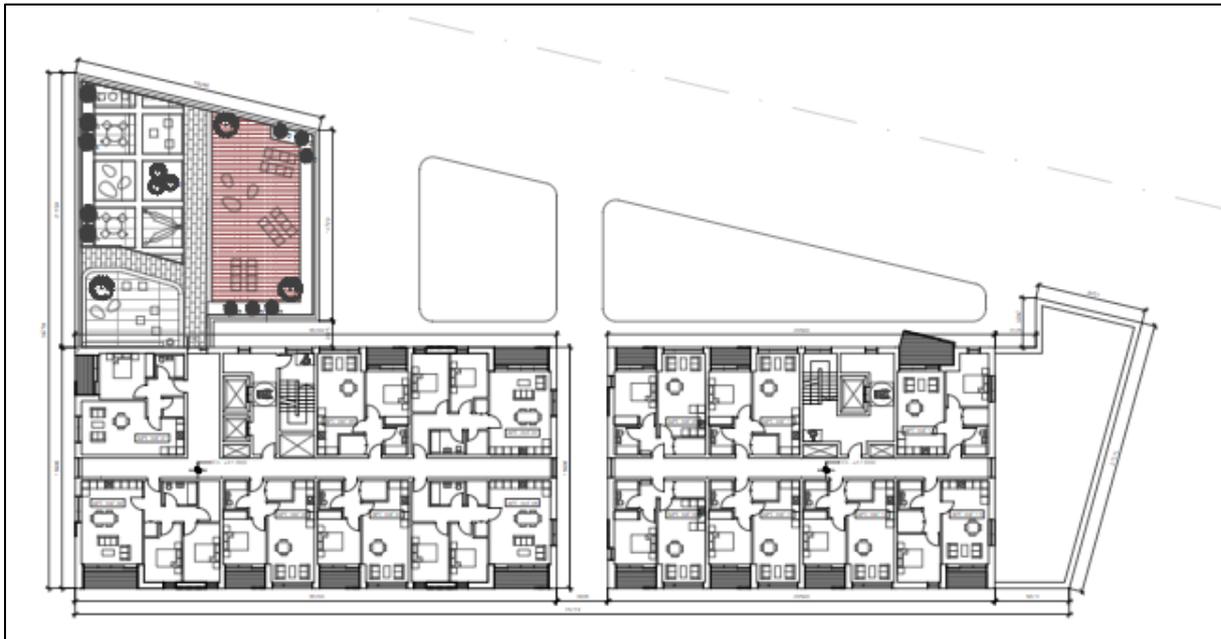


Figure 4-5: External Roof Garden Amenity Area/Space



Existing noise levels across the Site currently exceed this recommended limit. The proposed development will have amenity areas to the east along Redforge Road providing a distance buffer from traffic noise and onsite receptors. To the west an amenity area will be present linking to the internal residential amenity space, refer to Figure 4-4 below.

It is predicted that the private amenity area to the west (courtyard) linking to the internal amenity space will be shielded by traffic and rail noise and will not exceed the ProPG guideline of 50-55dB  $L_{Aeq,16hour}$ .

A rooftop garden for future occupants will be present above the retail space on the 4<sup>th</sup> floor to the southwest of the site, refer to Figure 4-5. The rooftop garden will have a 1.5m barrier surrounding it and will be ca. 29.1m in height which will provide a barrier effect to traffic noise on the Redforge Road. These measures should attenuate the traffic noise from Redforge Road by ca. 5dB.

The rooftop garden will be similar elevation as the adjacent railway track and it is predicted there will be little barrier effect from rail noise at this location. However, it is predicted that the external Roof Garden will not exceed the ProPG guideline of 50-55dB  $L_{Aeq,16hour}$  for use by future occupants.

#### **4.3.5 Element 4: – Assessment of Other Relevant Issues**

Element 4 of Stage 2 details other issues which may be considered relevant to the assessment which are:

- Compliance with relevant national and local policies;
- Magnitude and extent of compliance with ProPG;
- Likely occupants of the development;
- Acoustic Design V Unintended adverse consequences; and
- Acoustic Design V wider planning objectives.

#### **Compliance with Relevant National and Local Policy**

The Planning and Development (Strategic Housing Development) Regulations 2017 states that An Bord Pleanála will be the authority responsible for considering the impact of noise and not the relevant local authority [13].

The Cork County and City Noise Action Plan (NAP) [13] recommends the ProPG for new residential developments, and therefore need to be considered by An Bord Pleanála in their assessment of suitability.

#### **Magnitude and Extent of Compliance with ProPG**

As detailed above, the proposed development is within compliance with ProPG when windows are closed for living spaces. In addition, external amenity areas are predicted to be within compliance with ProPG recommended range.

#### **Likely Occupants of the Development**

The proposed development will be occupied by occupants for the full year..

The criteria adopted in this assessment is based upon criteria recommended for long-term/permanent dwellings and therefore considered appropriate.

#### **Acoustic Design V Unintended Adverse Consequences**

Design measures taken to reduce intrusion by noise have not had any unintended adverse consequences for the proposed development or the nearby environment.

#### **Acoustic Design V Wider Planning Objectives**

This assessment has demonstrated the living areas of the proposed development will achieve a good internal noise environment.

### **4.4 Predicted Impact**

#### **4.4.1 Proposed Development on Existing NSR**

Based on the existing baseline results, it was considered reasonable to assume that the majority of local NSRs will not find a noticeable change to the ambient sound character from the Proposed Development during the operational phase.

#### **4.4.2 Construction Impact on Existing NSR**

The Site is in close proximity to offsite NSRs therefore there is the potential for the exceedance of construction phase limits during the construction phase. However, best practice methods and mitigation measures including the preparation of a site-specific CEMP incorporating the noise mitigation principles within this document, by the appointed Contractor will ensure compliance with the construction limits.

#### **4.4.3 Impact of the Existing Environment on the Proposed Development**

The existing environment is dominated by traffic on the Redforge Road and rail noise from the adjacent rail line to the east. The proposed development utilising acoustic design as per ProPG to minimise impacts of noise on proposed residential developments has shown the proposed development will not be adversely impacted by the existing environment.

## 5 CONCLUSIONS

Based on the results of the baseline survey and the findings of this assessment, the following can be concluded:

- The results of the baseline survey ranged from 49dB to 67dB  $L_{Aeq,T}$  for the daytime and night-time.
- Strategic round three noise maps for road traffic show the  $L_{DEN}$  ranges from 55dB to 79dB across the Site and  $L_{night}$  ranges from 50dB to 64dB with higher contour bands closer to the Redforge Road.
- Strategic round three noise maps for rail noise show the  $L_{DEN}$  ranges from 55dB to 59dB less than 45m of the Site and  $L_{night}$  ranges from 50dB to 54dB less than 35m of the Site with higher contour bands closer to adjacent rail line to the east.
- The baseline monitoring is therefore in line with the predicted noise associated with the movement of traffic in the locality.
- The dominant noise sources experienced onsite were road traffic noise (daytime and night-time) and commercial noise (daytime) (idling engines, car washing, washing machine bays and commercial plant) on-site.
- A Stage 1 initial noise risk assessment for the Site determined the Site was a medium risk due to traffic noise from the Redforge Road and rail noise from the rail line to the east.
- The existing commercial noise audible on site will be removed in the event the proposed development is progressed.
- A Stage 2 assessment was undertaken with regards to the likely impact of both the internal and external amenity areas of the proposed development as per ProPG.
- The results indicate that the required daytime and night-time internal acoustic environment would be met utilising enhanced glazing and ventilation when windows are closed for the living spaces of the proposed development.
- The results indicate that the ProPG's recommended range of range of 50-55dB  $L_{Aeq,16hour}$  for the private external amenity areas (courtyard/amenity area to the west and the rooftop garden) are predicted to be below the ProPG recommended range of 50-55dB  $L_{Aeq,16hour}$ .
- Through acoustic design outlined within this report the proposed development would enable internal and private external noise levels to be achieved as per ProPG and BS 8233.

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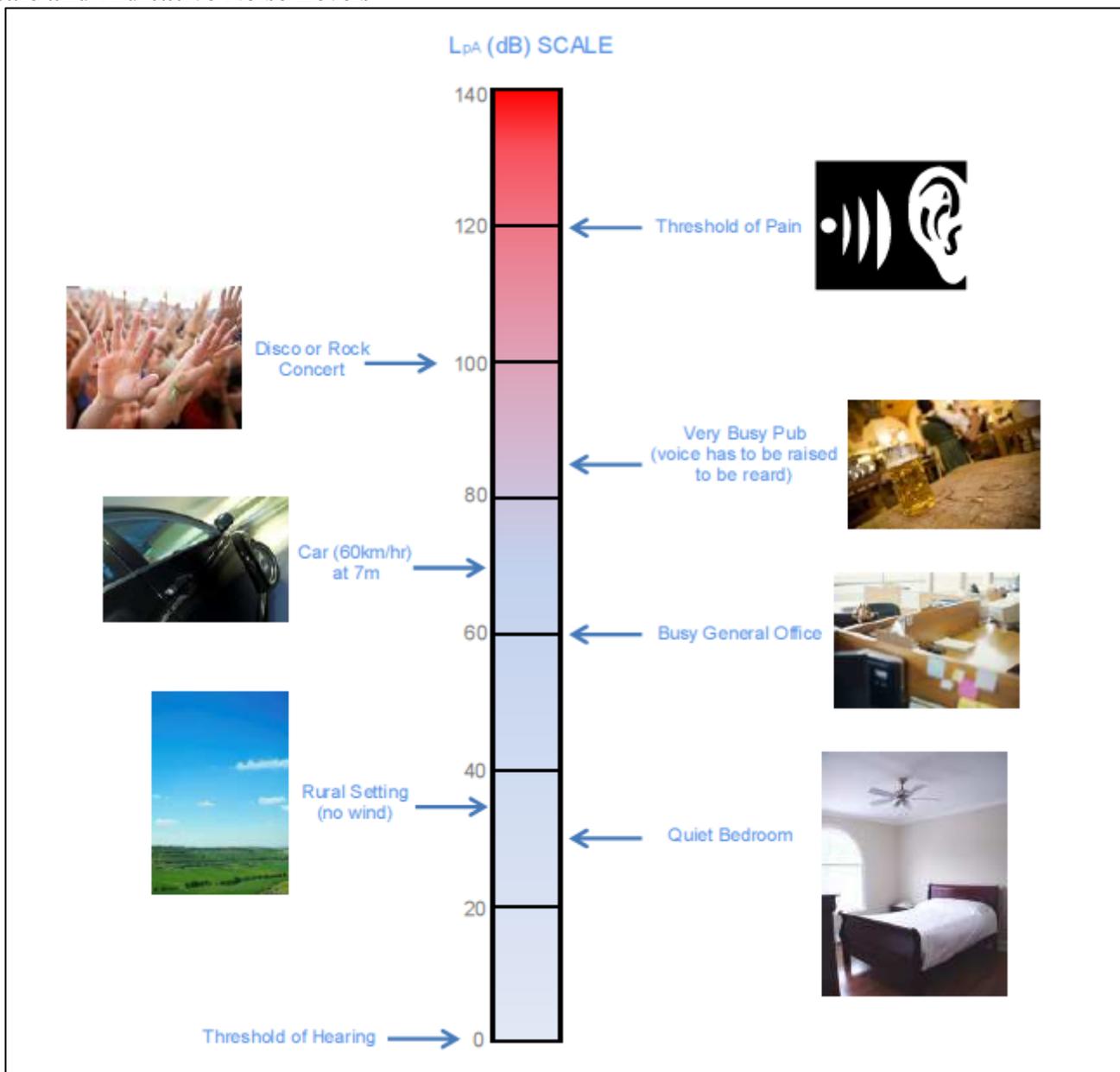
# Appendices

# Appendix A

## **Glossary of Acoustic Terminology**

<b>Abbreviation / Description Descriptor</b>	
Acoustic environment	Sound from all sound sources as modified by the environment
Ambient noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
A Weighted	A time weighting given to noise values to amend the values to suit the human ear response to the various frequency components of the sound.
Background noise	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 percent of a given time interval, T (LAF90,T).
dB (decibel)	A relative unit of measurements, based on a logarithmic scale to describe the ratio between the measured level and a reference or threshold level of 0dB. Unless otherwise stated 0dB within this report is $2 \times 10^{-5}$ pascals (Pa).
LA90,T	The A-Weighted noise level in the lower 90 percentile of the sampling interval 'T', excludes intermittent features typical of traffic and typically utilised to describe background noise.
LAeq,T	The equivalent continuous sound level, used to describe the fluctuating noise in terms of a single noise level over the same sampling time period (T).
LAr,T	The Rated Noise Level, equal to the LAeq during a specified time interval (T), plus specified adjustments for tonal character and/or impulsiveness of the sound.
LAm <sub>ax</sub>	The maximum RMS A-weighted sound pressure level occurring within a specified time period.
L <sub>den</sub>	Day-evening-night equivalent level, calculated as: $L_{den} = 10 \log \frac{1}{24} \left( 12 * 10^{\frac{L_{day}}{10}} + 4 * 10^{\frac{L_{evening} + 5}{10}} + 8 * 10^{\frac{L_{night} + 10}{10}} \right)$ <p>Where the L<sub>day</sub>, L<sub>evening</sub> and L<sub>night</sub> are as defined in ISO1 996-2:1 987, and for the duration of 12 hours, 4 hours and 8 hours respectively, are A-weighted long term Leq sound level.</p>
Noise	Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it, is known as noise
Noise Ambient	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
Noise Specific	The sound arising from the source under investigation, disregarding all external and residual sources.
NSR	Noise Sensitive Receptor - an identified dwelling, amenity area, recreational zone or other such place where a change in noise may result in a nuisance impact.
RMS	Root mean squared, mathematical method to account for swells and troughs within wave forms, such as sound.
Sound	Variation in atmospheric pressure that is detected by the human ear and results in the sensation of hearing
Soundscape	Consisting of the natural acoustical environment and the sounds created by humans such as ordinary human activities including conversation or work, and sounds of mechanical origin resulting from the use of industrial technology.
Time weighting (F, S, I)	One of the averaging times of Fast (125milliseconds), Slow (1second) or Impulse (35 milliseconds) used for the measurement of RMS sound pressure level in sound level meters.

# Scale and Indicative Noise Levels



**Source:** Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) January 2016

# Appendix B

## DAILY DATA

Weather station Data is available from 16/10/2015 to 09/06/2021

### Select Station & Date:

Station **Cork Airport**    Date **11/05/2021**    GO

## WEATHER STATION REPORTS FROM CORK AIRPORT

Date	Rainfall (mm)	Max Temp (°C)	Min Temp (°C)	Grass Min Temp (°C)	Mean Wind Speed (knots)	Max Gust (>= 34 knots)	Sunshine (hours)
11/05/2021	5.7	12.6	5.9	4.4	10.2		8.0

HOURLY VALUES (UTC) 11 May 2021 CORK AIRPORT

