

# **Noise Impact Assessment and Acoustic Design Statement**

## **Victoria Cross Strategic Housing Development**



**On behalf of**  
**Belmount Developments Limited**  
**Student Housing Victoria Cross**  
**(South), Cork**



MALONE O'REGAN





Ground Floor – Unit 3  
Bracken Business Park  
Bracken Road, Sandyford  
Dublin 18, D18 V32Y  
Tel: +353- 1- 567 76 55  
Email: enviro@mores.ie


**Title: Noise Impact Assessment and Acoustic Design Statement, Victoria Cross Strategic Housing Development, on behalf of Belmount Developments Limited, Student Housing Victoria Cross (South), Cork**

**Job Number: E1976**

**Prepared By: Kenneth Goodwin**

**Signed:** 

**Checked By: Jessica Beresford**

**Signed:** 

**Approved By: Kenneth Goodwin**

**Signed:** 

## Revision Record

| Issue No. | Date      | Description | Remark | Prepared | Checked | Approved |
|-----------|-----------|-------------|--------|----------|---------|----------|
| 01        | 25/07/'22 | Report      | FINAL  | KG       | JB      | KG       |
|           |           |             |        |          |         |          |
|           |           |             |        |          |         |          |

## Copyright and Third-Party Disclaimer

MOR has prepared this report for the sole use of our client (as named on the front of the report) in accordance with the Client's instructions using all reasonable skill and competence and generally accepted consultancy principles. The report was prepared in accordance with the budget and terms of reference agreed with the Client and does not in any way constitute advice to any third party who is able to access it by any means. MOR excludes to the fullest extent lawfully permitted all liability whatsoever for any costs, liabilities or losses arising as a result of or reliance upon the contents of this report by any person or legal entity (other than the Client in accordance with the terms of reference). MOR has not verified any documents or information supplied by third parties and referred to herein in compiling this document and no warranty is provided as part of this document. No part of this report may be copied or reproduced without express written confirmation from MOR. Any methodology contained in this report is provided to the Client in confidence and must not be disclosed or copied to third parties without the prior written agreement of MOR. Disclosure of such information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Third parties who obtains access to this report by any means, including disclosure by the Client, will be subject to the Copyright and Third-Party Disclaimer contained herein.



**Noise Impact Assessment and Acoustic Design Statement**  
**Victoria Cross Strategic Housing Development**  
**Belmount Developments Limited**  
**Student Housing Victoria Cross (South), Cork**

**Contents**

|  |           |
|--|-----------|
| <b>EXECUTIVE SUMMARY .....</b>   | <b>IV</b> |
| <b>1 INTRODUCTION .....</b>  | <b>1</b>  |
| 1.1 Scope.....   | 1         |
| <b>2 METHODOLOGY .....</b>   | <b>3</b>  |
| 2.1 Competency .....   | 3         |
| 2.2 Desk Based Assessment .....  | 3         |
| 2.3 Field Survey .....   | 4         |
| 2.4 Impact Assessment.....   | 5         |
| 2.4.1 Construction Assessment .....  | 5         |
| 2.4.2 Operational Assessment .....   | 6         |
| 2.4.3 Site Suitability & Acoustic Design .....                               | 6         |
| 2.4.4 BS8233 Guidance .....  | 8         |
| <b>3 ACOUSTIC CHARACTERISATION AND STAGE 1 – NOISE RISK ASSESSMENT .....</b> | <b>10</b> |
| 3.1 Site Context and Description .....                                       | 10        |
| 3.2 Proposed Development .....   | 10        |
| 3.3 Baseline Noise Survey .....  | 11        |
| 3.3.1 Weather Conditions .....   | 11        |
| 3.3.2 Baseline Acoustic Results.....   | 13        |
| 3.4 Strategic Noise Mapping.....   | 15        |
| 3.5 Future Noise Environment.....  | 17        |
| 3.6 ProPG Guidance.....  | 17        |
| 3.6.1 Stage 1 – Initial Noise Risk Assessment.....                           | 17        |
| <b>4 ACOUSTIC IMPACT .....</b>   | <b>19</b> |
| 4.1 Construction Phase .....   | 20        |

|              |   |           |
|--------------|---|-----------|
| <b>4.1.1</b> | <b>Demolition Stage .....</b>   | <b>21</b> |
| <b>4.1.2</b> | <b>Construction Stage .....</b>   | <b>21</b> |
| <b>4.1.3</b> | <b>Construction Phase Vibration .....</b>                                       | <b>21</b> |
| <b>4.1.4</b> | <b>Construction Phase Mitigation Measures .....</b>                             | <b>22</b> |
| <b>4.2</b>   | <b>Operational Phase .....</b>  | <b>22</b> |
| <b>4.2.1</b> | <b>Sound Generated within External Amenity Areas and Student Movement .....</b> | <b>23</b> |
| <b>4.3</b>   | <b>Pro PG Stage 2 - Full Acoustic Assessment .....</b>                          | <b>23</b> |
| <b>4.3.1</b> | <b>Do Nothing Scenario .....</b>  | <b>23</b> |
| <b>4.3.2</b> | <b>Element 1: Good Acoustic Design Process .....</b>                            | <b>23</b> |
| <b>4.3.3</b> | <b>Element 2: Internal Noise Levels - BS8223 Assessment .....</b>               | <b>28</b> |
| <b>4.3.4</b> | <b>Element 3: – Assessment of Other Relevant Issues .....</b>                   | <b>29</b> |
| <b>4.4</b>   | <b>Predicted Impact .....</b>   | <b>30</b> |
| <b>4.4.1</b> | <b>Proposed Development on Existing NSR .....</b>                               | <b>30</b> |
| <b>4.4.2</b> | <b>Construction Impact on Existing NSR .....</b>                                | <b>30</b> |
| <b>4.4.3</b> | <b>Impact of the Existing Environment on the Proposed Development .....</b>     | <b>30</b> |
| <b>5</b>     | <b>CONCLUSIONS .....</b>  | <b>31</b> |
|              | <b>REFERENCES .....</b>   | <b>32</b> |

## FIGURES

|   |    |
|---|----|
| Figure 1-1 Site Location .....  | 1  |
| Figure 2-1: Noise Monitoring Locations .....  | 4  |
| Figure 2-2: ProPG Stage 1 Noise Risk Assessment .....                                 | 7  |
| Figure 3-1: Existing Site – Google Aerial July 2022 Extract .....                     | 10 |
| Figure 3-2: Proposed Development Site Layout .....                                    | 11 |
| Figure 3-3: Round 3, Road Noise $L_{DEN}$ .....                                       | 15 |
| Figure 3-4: Round 3, Road Noise $L_{night}$ .....                                     | 16 |
| Figure 3-5: Round 3, Airport Noise $L_{DEN}$ .....                                    | 17 |
| Figure 4-1: Noise Sensitive Receptors (NSRs) .....                                    | 19 |
| Figure 4-2: Location of Plant Room .....  | 22 |
| Figure 4-3: Ground Floor Layout .....   | 24 |
| Figure 4-4: 1st Floor Layouts .....   | 24 |
| Figure 4-5: 2nd to 5th Floor Layouts .....  | 25 |
| Figure 4-6: External Wall Construction .....  | 26 |
| Figure 4-7: Site Layout Showing the Internal Amenity Along the Western Boundary ..... | 27 |

|   |    |
|---|----|
| Figure 4-8: Roof Layout Showing Rooftop Amenity ..... | 27 |
| Figure 4-9: Indicative Roof Makeup.....               | 29 |

## **TABLES**

|   |    |
|---|----|
| Table 2-1: Noise Monitoring Locations .....   | 4  |
| Table 2-2: BS5228 ABC Method for assessing Construction Noise Impact .....                              | 5  |
| Table 2-3: Internal Ambient Criteria of BS8233 .....  | 8  |
| Table 3-1: Summary of Weather Conditions at Cork Airport Synoptic Station .....                         | 11 |
| Table 3-2: Baseline Daytime Acoustic Results 8 <sup>th</sup> February 2021 .....                        | 13 |
| Table 3-3: Baseline Night-time Acoustic Results 8 <sup>th</sup> and 9 <sup>th</sup> February 2021 ..... | 14 |
| Table 3-4: Summary of Noise Levels Across the Site.....   | 17 |
| Table 4-1: Noise Sensitive Receptors .....  | 19 |
| Table 4-2: Typical Demolition Stage Predicted Noise Emissions.....                                      | 21 |
| Table 4-3: Typical Construction Stage Predicted Noise Emissions.....                                    | 21 |
| Table 4-4: External Sound Insulation Rating .....   | 28 |
| Table 4-5: Assessment Summary Daytime and Night-time .....  | 28 |

## **APPENDICES**

### **Appendix A: Glossary of Terms**

## EXECUTIVE SUMMARY

Malone O'Regan Environmental (MOR) has been commissioned by Bellmount Developments Limited (herein referred to as 'Bellmount') to provide a noise assessment of the proposed development of a Strategic Housing Development (SHD), Wilton Road, Victoria Cross, Cork City ('the Site').

A detailed noise survey was completed by a MOR on Tuesday the 14<sup>th</sup>, Wednesday 15<sup>th</sup> and Wednesday 22<sup>nd</sup> of June 2022 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 noise monitoring which characterised the existing noise environment. The daytime  $L_{Aeq,T}$  ranged from 55dB to 63dB and background levels ( $L_{A90,T}$ ) ranged from 47dB to 52dB for the daytime period.

The night-time  $L_{Aeq,T}$  ranged from 52dB to 65dB and background levels ( $L_{A90,T}$ ) ranged from 36dB to 61dB for night-time period.

The local ambient noise was influenced by commercial activities locally (daytime only), traffic on the Victoria Cross Road/R641 and National Road N22 traffic.

Noise Sensitive Receptors (NSRs) are present less than 20m from the Site's boundary. The construction phase will be of a short 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 ProPG. Acoustic design has been implemented within the design, layout and fit out of the proposed apartments. As part of this design, it will be necessary to utilise enhanced glazing systems with a sound reduction of  $\geq 37$ dB to ensure a good internal acoustic environment when windows are closed. The internal noise levels when windows are open will be above the recommended limit, however this will be a choice by future occupants.

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

The ground floor internal and roof top external amenity areas are predicted to be equal to or below the ProPG recommended noise level range of  $L_{Aeq, 16hour}$  50-55dB during the daytime due to the proposed layout and structural design.

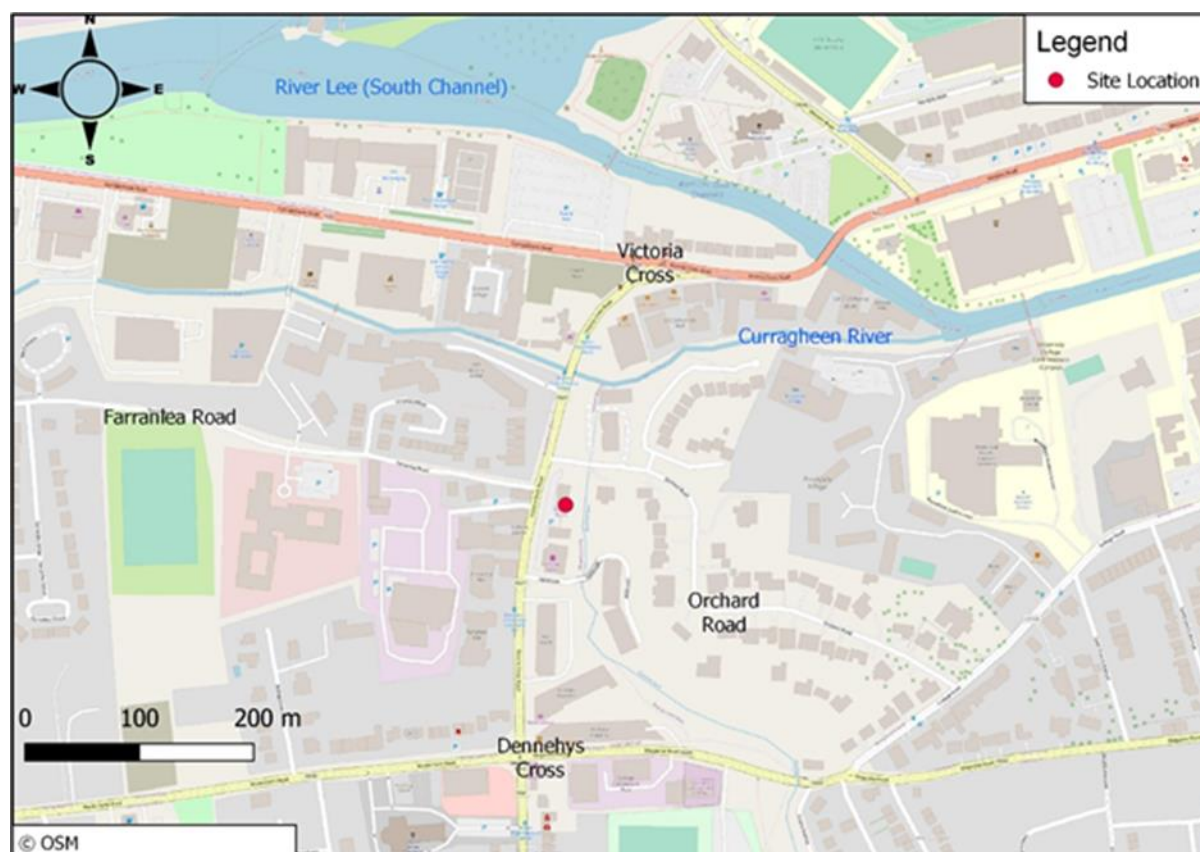




# 1 INTRODUCTION

Malone O'Regan Environmental (MOR) has been commissioned by Belmount Developments Ltd. ('the Applicant') to provide a noise assessment of the proposed Strategic Housing Development (SHD) and all associated works on lands at Wilton Road, Victoria Cross, Bishopstown, Cork (OS Reference W65206 71067). 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 -308043-20) that any 'Noise Impact should also be addressed.' Therefore, 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.

An ISO 9613 assessment of the likely operational noise impact from the proposed development on existing and future noise sensitive receptors.

A BS5228 assessment to the likely impact on existing noise sensitive receptors during the construction stage of this proposed development.

The scope of this ProPG assessment is to assess internal and external noise levels of the proposed development that is exposed to airborne noise from transport sources following good acoustic design considerations to enable sustainable development.

The 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.

## 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.

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

### 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 18 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;

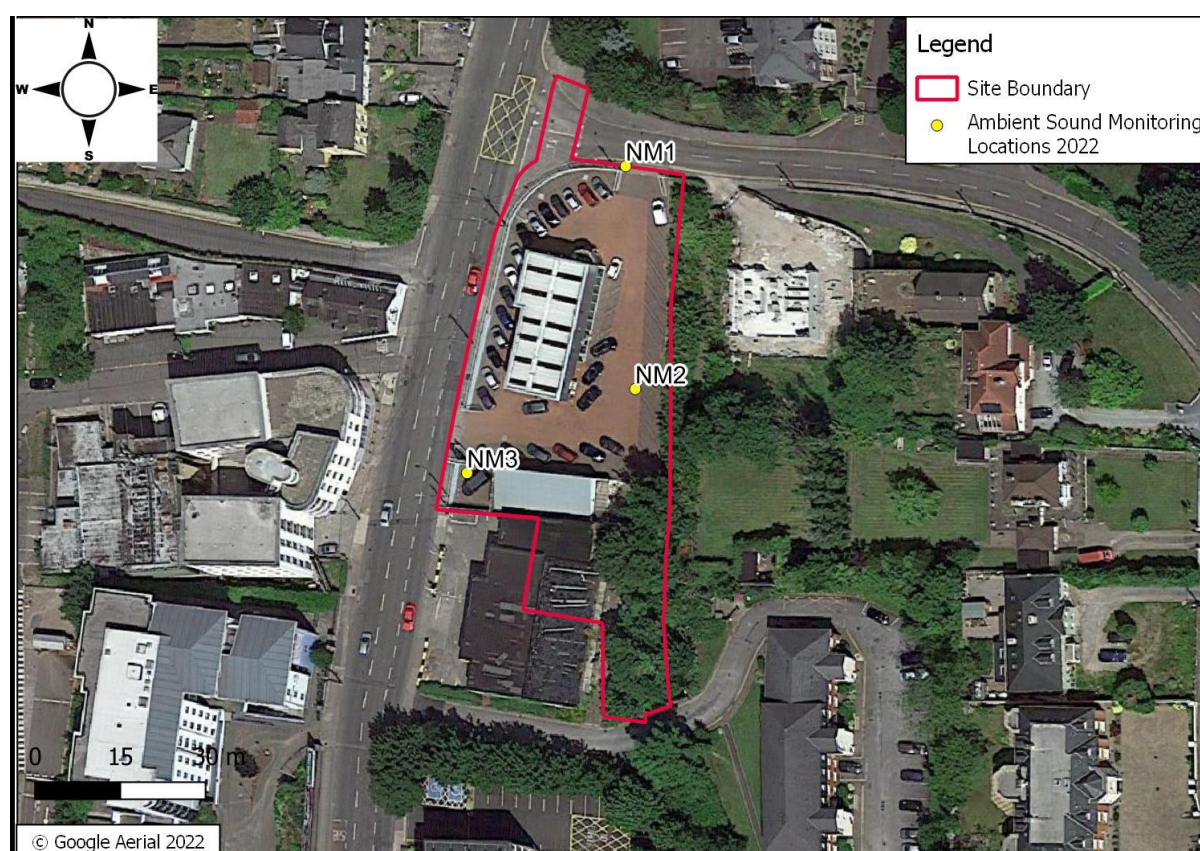
- Characterisation of the local noise environment utilising published and publicly available information including the Cork City Council *Noise Action Plan 2018-2023*; and,
- Review of best practice UK guidance for noise impact assessments in the current absence of an Irish or recognised International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

## 2.3 Field Survey

A detailed noise survey was completed by a MOR acoustician on Tuesday the 14<sup>th</sup> Wednesday 15<sup>th</sup> and Wednesday 22<sup>nd</sup> of June 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 -01:00).

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         | 565169 | 571131 | Located at the north-eastern area of the site. In proximity to the Orchard Road and Victoria Cross Road.               |
| NM2         | 565170 | 571092 | Located at the south-eastern boundary of the site. In close proximity to the Victoria Cross Road and the Orchard Road. |



| NM Location | ITM    |        | Details  |
|-------------|--------|--------|--|
|             | X      | Y      |  |
| NM3         | 565141 | 571077 | Located at the south-western boundary of the site. Adjacent to the Victoria Cross Road and in close proximity to the Orchard Road. |

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;
- NTI XL2 Sound Level Meter 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 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.

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 existing ambient, 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 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                       |

| Assessment category and threshold value period<br>( $L_{Aeq}$ ) | Threshold value, in decibels (dB)  |                          |                          |
|---|--|--------------------------|--------------------------|
|   | Category A <sup>A)</sup>   | Category B <sup>B)</sup> | Category C <sup>C)</sup> |
| <b>Note 1</b>   | A significant effect has been deemed to occur if the total $L_{Aeq}$ 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 $L_{Aeq}$ 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 Noise Sensitive Receptors (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] and ISO 9613-2:1996 Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation [6]. In addition, the 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

Objective 12.21 Noise Levels in Developments of 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

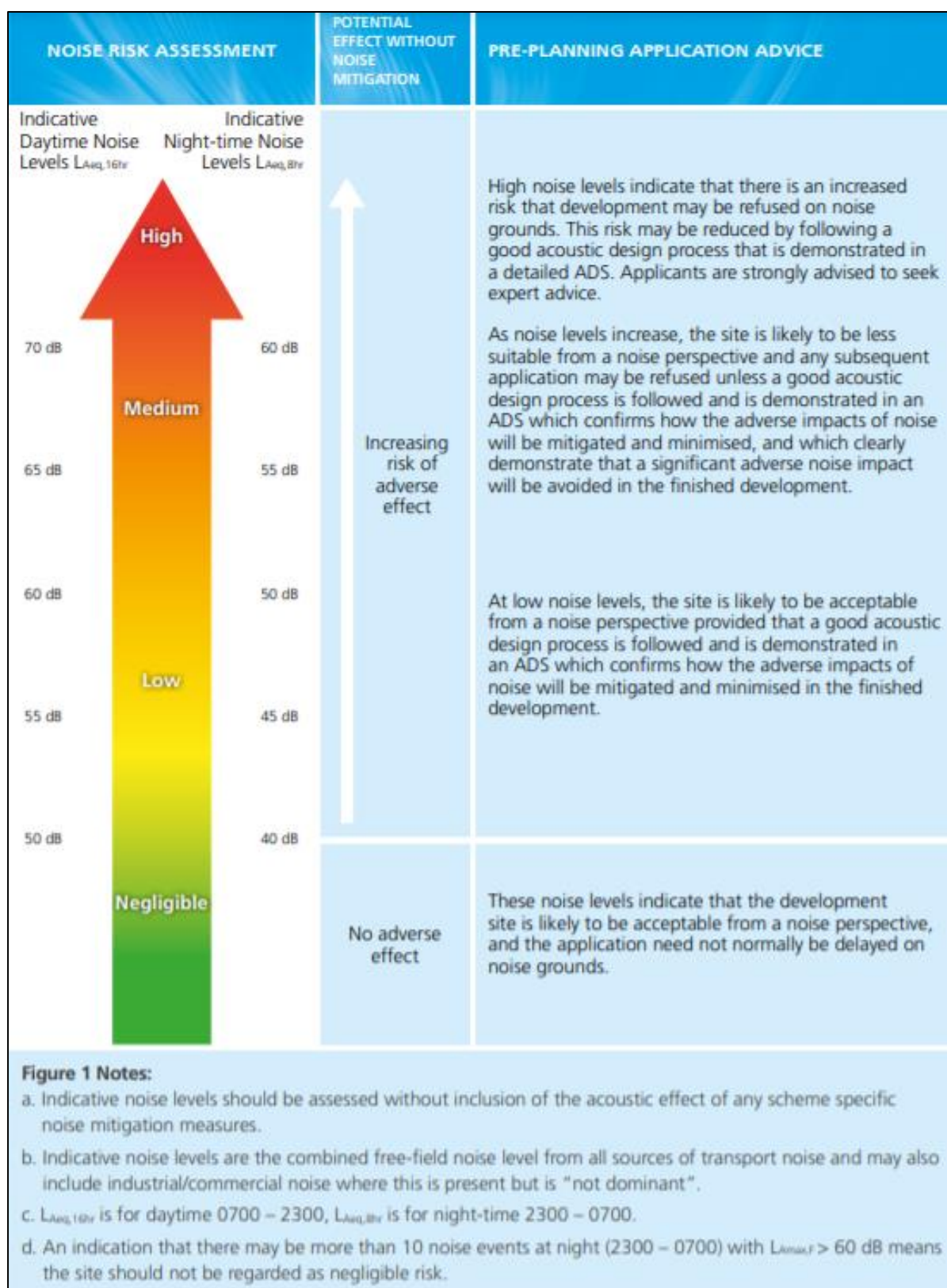
The ProPG provides guidance to local authorities to minimise impacts of noise on proposed residential developments, refer to Figure 2-2.

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.

Figure 2-2: ProPG Stage 1 Noise Risk Assessment





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 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<br>(07:00 to 23:00) | Night<br>(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.

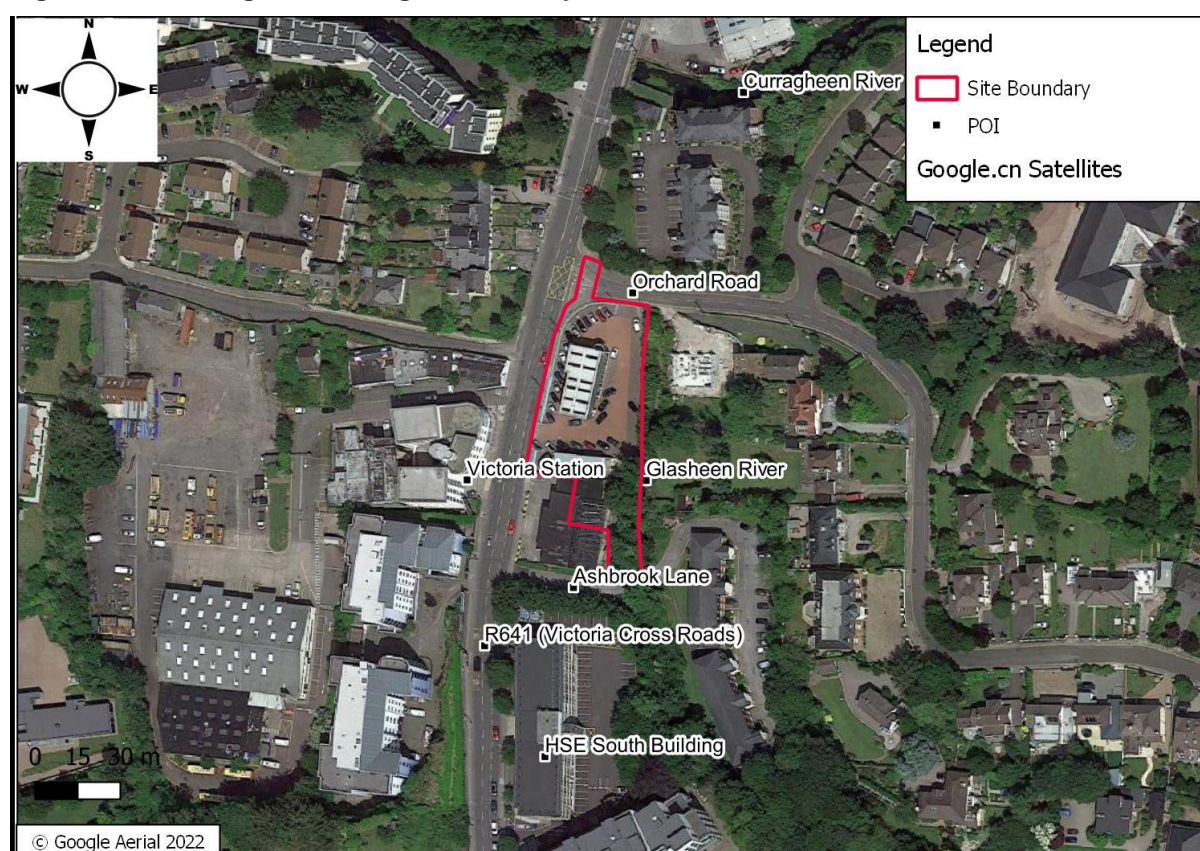
### 3 ACOUSTIC CHARACTERISATION AND STAGE 1 – NOISE RISK ASSESSMENT

#### 3.1 Site Context and Description

The Site is located at Victoria Cross, Bishopstown, Co. Cork, within a predominately urban landscape. The Site is approximately 0.29 hectares in size. The surrounding area is a mix of private residential and university campus accommodation as well as restaurants, retailers, and other amenities due to the close proximity of University College Cork.

The Site is predominately made up of buildings and areas of hardstanding with vegetation along the eastern boundary. The Site is bordered to the west by the R641 and the Orchard Road to the north. The Site is bordered by a heavily modified riverway to the east.

**Figure 3-1: Existing Site – Google Aerial July 2022 Extract**



#### 3.2 Proposed Development

Bellmount Developments Limited intend to apply to An Bord Pleanála for planning permission for a strategic housing development at The Former Finbarr Galvin Motor Dealership, Fronting on to Victoria Cross Road and Orchard Road, Bishopstown, Cork.

The development will consist of:

- The demolition of existing structures on site; and

- The construction of 78 no. student accommodation apartments (ranging in size from single bed studio apartments to 8-bed apartments) comprising a total of 206 no. bed spaces in 1 no. 6 storey block;

- Student amenity facilities including a study area, games room, lounge space, laundry room and server/ICT room;

The provision of landscaping and amenity areas including a courtyard space (including modifications to the external amenity area of the student accommodation scheme permitted under An Bord Pleanála Ref. 19/38385), 1 no. rooftop terrace and a riverfront amenity incorporating a pedestrian and cycle path accessing onto Ashbrook Heights and Orchard Road;

The provision of a set down area, 1 no. access point (for emergency vehicles only), footpaths and repositioned pedestrian crossing and associated tactile paving on Orchard Road;

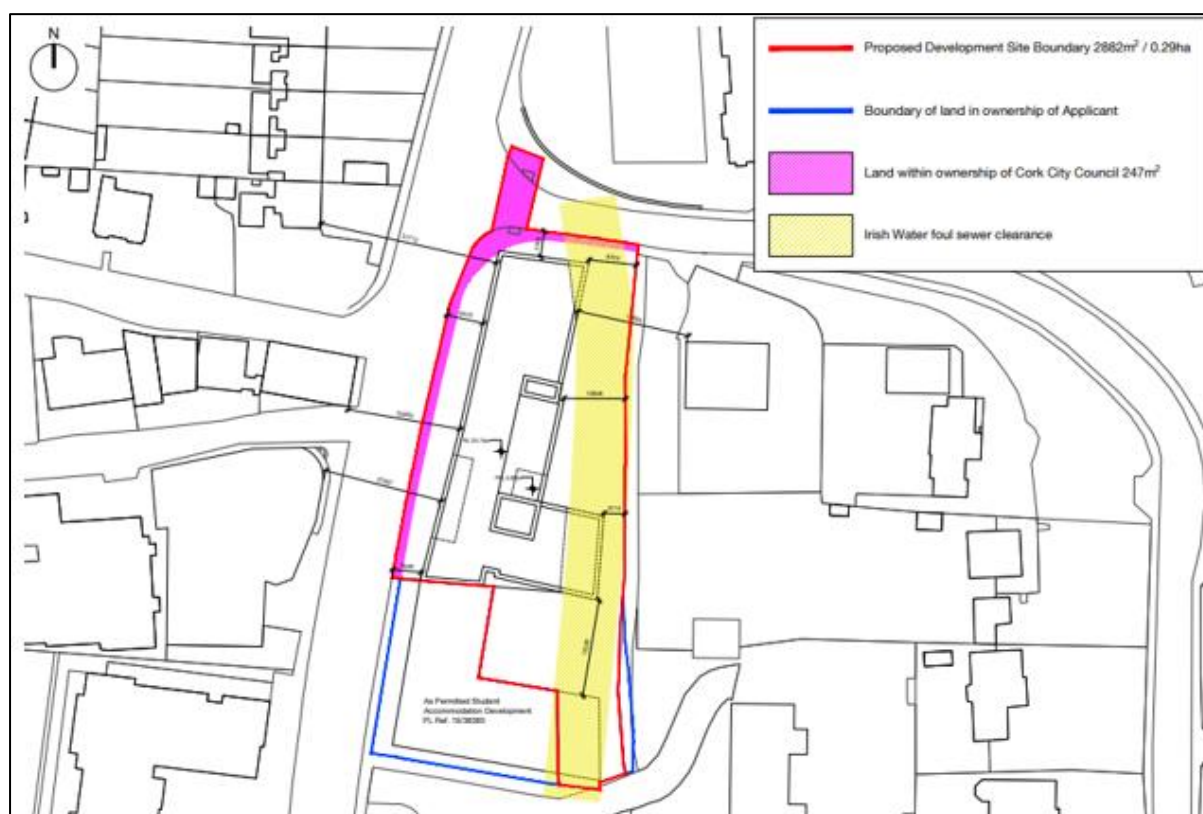
The provision of a new junction build out at the junction of Orchard Road and Victoria Cross Road;

The provision of footpaths and landscaped areas along Victoria Cross Road; and

All associated ancillary development including pedestrian/cyclist facilities, lighting, drainage, boundary treatments, bin and bicycle storage and plant at ground and roof top levels.

Figures 3-2 below shows the Site Layout of the proposed development.

**Figure 3-2: Proposed Development Site Layout**



### 3.3 Baseline Noise Survey

#### 3.3.1 Weather Conditions

Weather conditions during the ambient sound survey events were suitable as per guidance document. The Met Eireann data for the days is shown in Table 3-1 below.

**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) |
|------|---------------|---------------|---------------|---------------------|-------------------------|-----------------------|
|------|---------------|---------------|---------------|---------------------|-------------------------|-----------------------|

|           |    |      |      |     |     |  |
|-----------|----|------|------|-----|-----|--|
| 14/06/'22 | tr | 16.5 | 9.4  | 5.5 | 5.3 |  |
| 15/06/'22 | tr | 18.5 | 9.5  | 4.0 | 6.3 |  |
| 22/06/'22 | tr | 20.2 | 13.6 | 8.9 | 6.4 |  |

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



### 3.3.2 Baseline Acoustic Results

Tables 3-2 and 3-3 below detail the baseline acoustic survey results for the daytime and night-time periods.

**Table 3-2: Baseline Daytime Acoustic Results 8<sup>th</sup> February 2021**

|     | NM Location | Start Time and Date | L <sub>Aeq,15min</sub> | L <sub>A10, 15min</sub> | L <sub>A90, 15min</sub> | L <sub>AFmax</sub> | Commentary – Peak note audible events during survey   |
|-----|-------------|---------------------|------------------------|-------------------------|-------------------------|--------------------|---|
| Day | NM1         | 12:01-14/06/22      | 58                     | 61                      | 52                      | 69                 | Wind speed 0-2 m/s. Sunny and partly cloudy. Birdsong & birdcall audible. Stream flow audible.<br>Run 1: Church bells audible. Bird's singing audible. Chainsaw in the distance audible.<br>Run 2:<br>Run 3: Ambulance siren audible. People on footpath audible. Plane passing overhead audible. Cutting noise in distance audible.<br>Run 4: Car horn audible. Loud music playing from car audible. Loud motorbike passing audible.                             |
|     |             | 12:06 - 22/06/22    | 62                     | 61                      | 49                      | 88                 |   |
|     |             | 13:37-22/06/22      | 57                     | 61                      | 49                      | 70                 |   |
|     |             | 14:40-22/06/22      | 55                     | 58                      | 50                      | 67                 |   |
|     | NM2         | 11:26-14/06/22      | 56                     | 59                      | 47                      | 71                 | Wind speed 1-2m/s. Sunny and partly cloudy. Birdsong audible. Trees blowing audible.<br>Run 1: Reversing siren from vehicle audible. Banging noise also audible.<br>Run 2: Banging noise outside the site audible. Beeping noise also audible.<br>Run3: Plane passing overhead audible. Loud music from car audible. Banging noise in distance audible.<br>Run 4: Loud motorbike audible. Van door closing outside the site audible. People talking also audible. |
|     |             | 12:36-14/06/22      | 57                     | 60.                     | 47                      | 74                 |   |
|     |             | 13:19-22/06/22      | 63                     | 60                      | 51                      | 79                 |   |
|     |             | 14:23-22/06/22      | 62                     | 58                      | 52                      | 74                 |   |
|     | NM3         | 11:06-14/06/22      | 62                     | 65                      | 51                      | 73                 | Wind speed 0-1 m/s. Sunny. Birdsong audible.<br>Run 1: Car horn audible. People passing on footpath audible   |

|  | NM Location | Start Time and Date | L <sub>Aeq,15min</sub> | L <sub>A10, 15min</sub> | L <sub>A90, 15min</sub> | L <sub>AFmax</sub> | Commentary – Peak note audible events during survey   |
|--|-------------|---------------------|------------------------|-------------------------|-------------------------|--------------------|---|
|  |             | 12:18<br>14/06/22   | 61                     | 66                      | 52                      | 72                 | Run 2: Plane overhead audible. Cutting & banging noise in distance.<br>Run 3: Bus braking audible. Loud music from car audible.<br>Run 4: Car horn audible. Car braking also audible. |
|  |             | 13:02-<br>22/06/22  | 63                     | 66                      | 51                      | 79                 |   |
|  |             | 14:05-<br>22/06/22  | 62                     | 65                      | 52                      | 74                 |   |

**Table 3-3: Baseline Night-time Acoustic Results 8<sup>th</sup> and 9<sup>th</sup> February 2021**

|       | NM Location | Start Time and Date | L <sub>Aeq,15min</sub> | L <sub>A10,15min</sub> | L <sub>A90, 15min</sub> | L <sub>AFmax</sub> | Commentary   |
|-------|-------------|---------------------|------------------------|------------------------|-------------------------|--------------------|--|
| Night | NM1         | 23:39-<br>14/06/22  | 54                     | 58                     | 39                      | 69                 | Wind speed 1-2m/s. Birdsong audible.<br>Run 1: River Flow audible. Plane overhead audible. People on footpath talking audible. Car brakes squeaking audible. |
|       |             | 0:44-<br>14/06/22   | 52                     | 57                     | 38                      | 64                 | Run 2: Bus braking audible. People talking audible. Car horn also audible.   |
|       | NM2         | 23:18-<br>14/6/22   | 65                     | 66                     | 60                      | 67                 | Wind speed 1-2m/s.<br>Run 1: Alarm beeping audible. Plane overhead audible.  |
|       |             | 00:18-<br>15/06/22  | 52                     | 56                     | 36                      | 67                 | Run 2: Gate closing nearby audible. Music in car audible. Car horn audible.  |
|       | NM3         | 23:00-<br>14/06/22  | 62                     | 62                     | 61                      | 62                 | Wins speed 1-2 m/s. Alarm beeping audible.<br>Run 1: Plane overhead audible. Trailer rattling passing audible.   |
|       |             | 00:00-<br>15/06/22  | 58                     | 62                     | 47                      | 62                 | Run 2: Person passing pulling suitcase audible. Car starting near to meter audible.  |

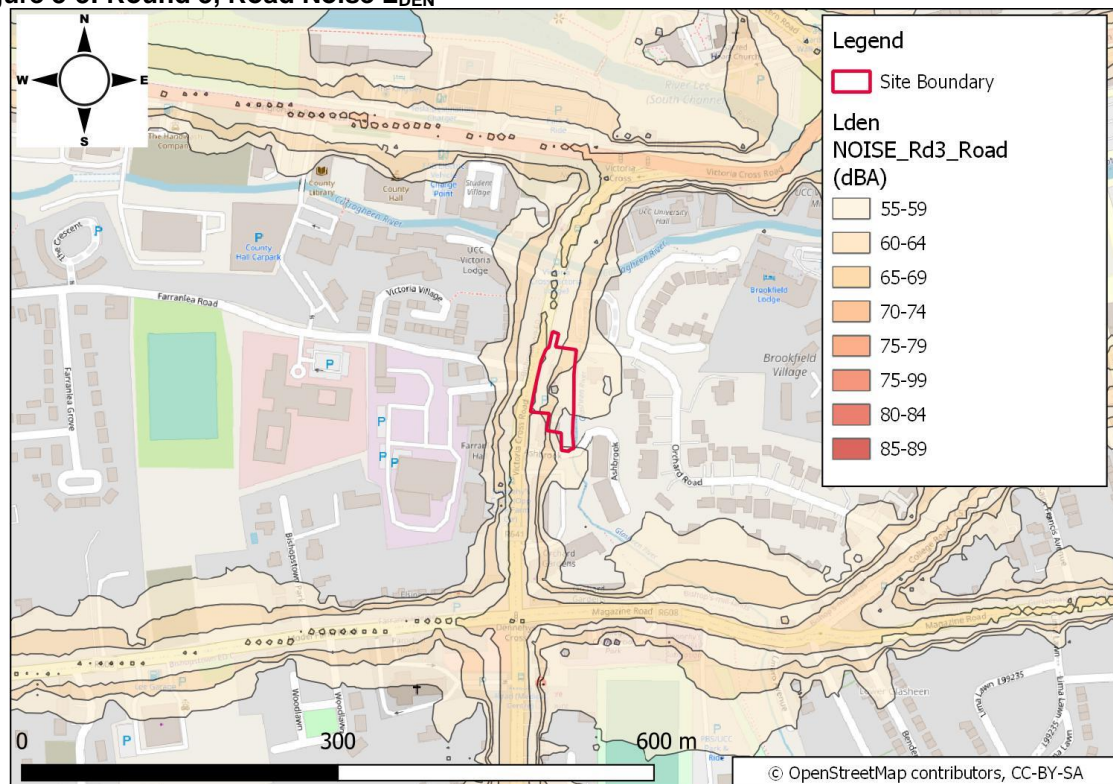
### 3.4 Strategic Noise Mapping

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 3-3 to 3-5 below show Round 3 Road ( $L_{DEN}$  and  $L_{night}$ ) and Airport noise ( $L_{DEN}$ ) maps. Rail noise and night-time Airport ( $L_{night}$ ) noise impacts on the locality were discounted as the associated noise contours were >3km from the Site.

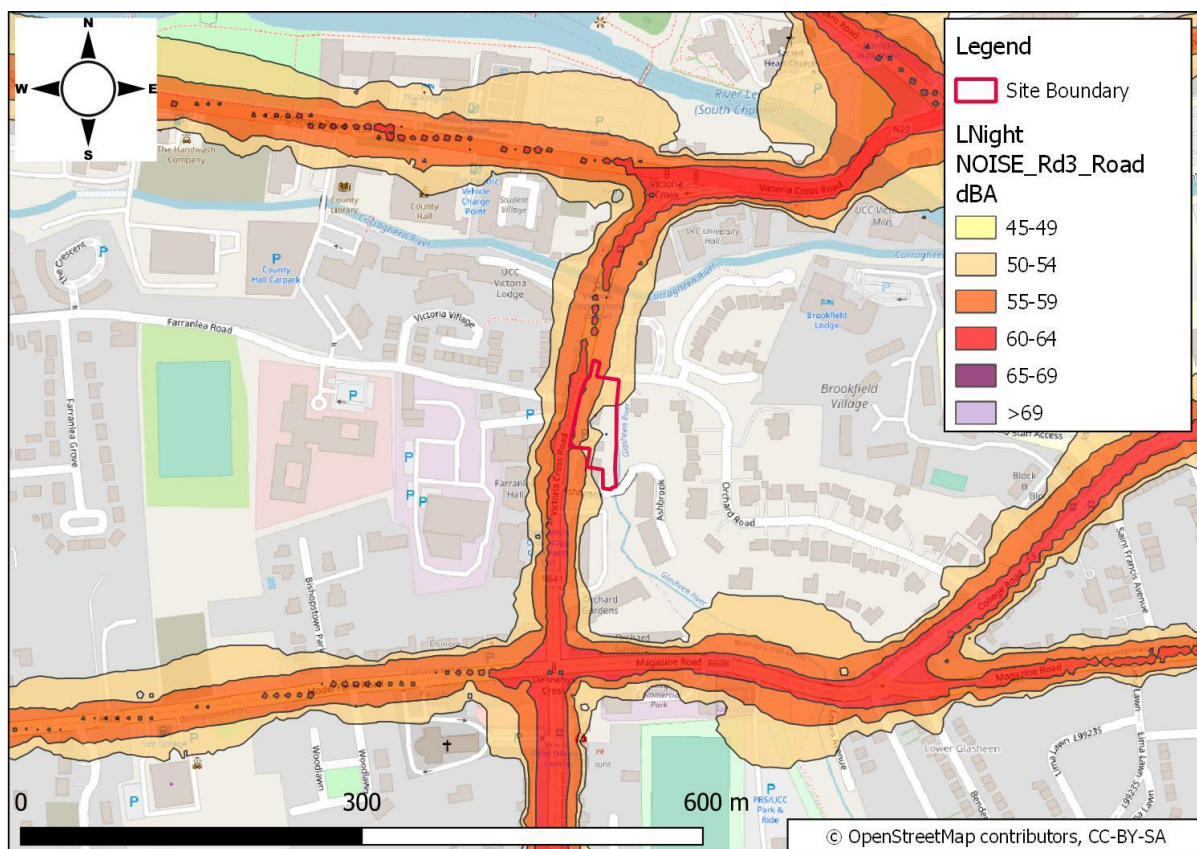
**Figure 3-3: Round 3, Road Noise  $L_{DEN}$**



The road noise  $L_{DEN}$  ranges from 55dB to 59dB on the eastern boundaries of the Site, rising to the 60dB to 64dB contour on the western boundary of the Site.

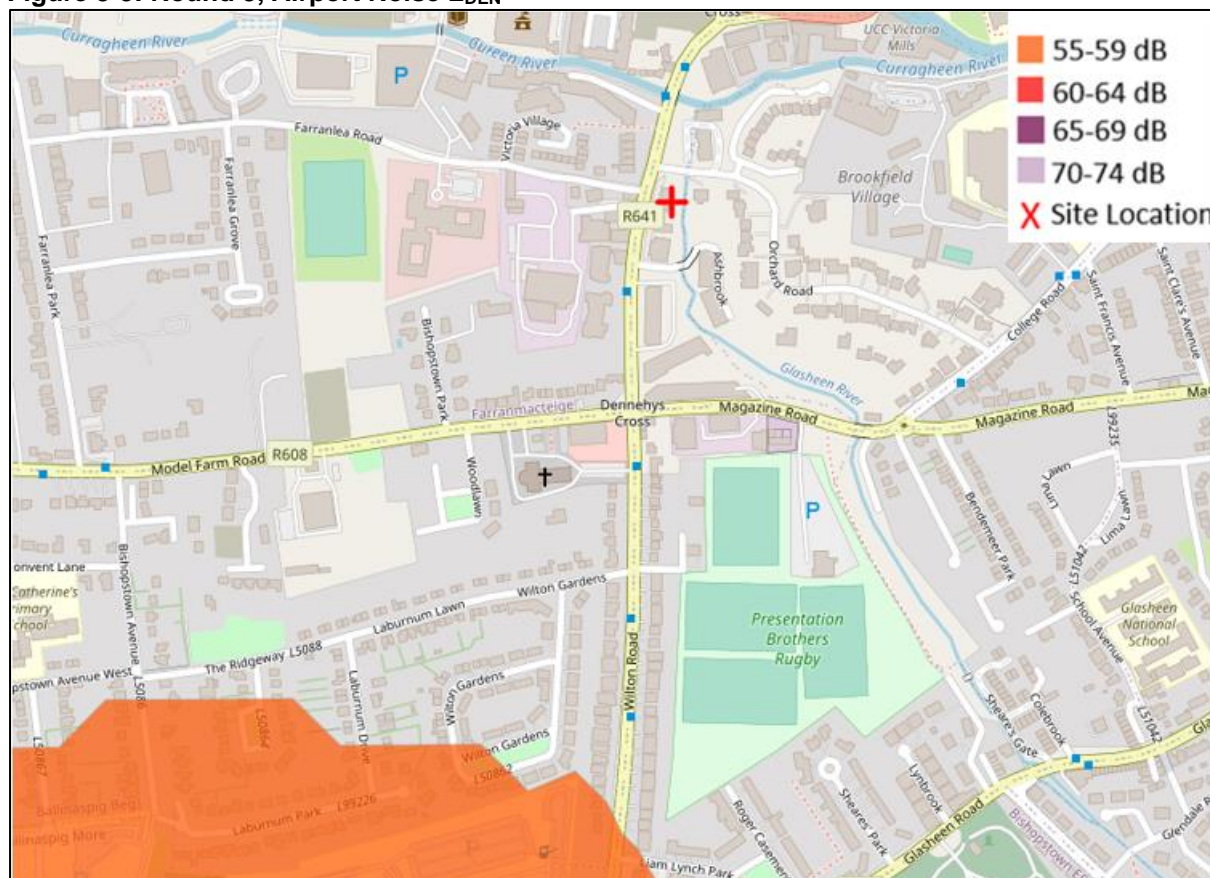


**Figure 3-4: Round 3, Road Noise  $L_{night}$**



The road noise  $L_{night}$  shows the central and western portion of the site is within the 50dB to 54 dB and the 55dB to 59dB contour.

**Figure 3-5: Round 3, Airport Noise  $L_{DEN}$**



The airport noise  $L_{DEN}$  contour of 55dB - 59dB is ca.600m to the south of the Site.

### 3.5 Future Noise Environment

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 limited parking proposed within the design.

The existing occupier is a derelict historic vehicle sales commercial unit and associated parking.

### 3.6 ProPG Guidance

#### 3.6.1 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 3-4 below.

**Table 3-4: Summary of Noise Levels Across the Site**

| Noise Source                     | $L_{day}$ dB | $L_{night}$ dB             | $L_{DEN}$ dB               |
|----------------------------------|--------------|----------------------------|----------------------------|
| Victoria Cross Road              |              | 45dB (east) to 59dB (west) | 55dB (east) to 64dB (west) |
| Ambient Measurements $L_{A90,T}$ | 49dB to 54dB | 38dB to 54dB               |                            |
| Ambient Measurements $L_{Aeq,T}$ | 58dB to 62dB | 53dB to 60dB               |                            |

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

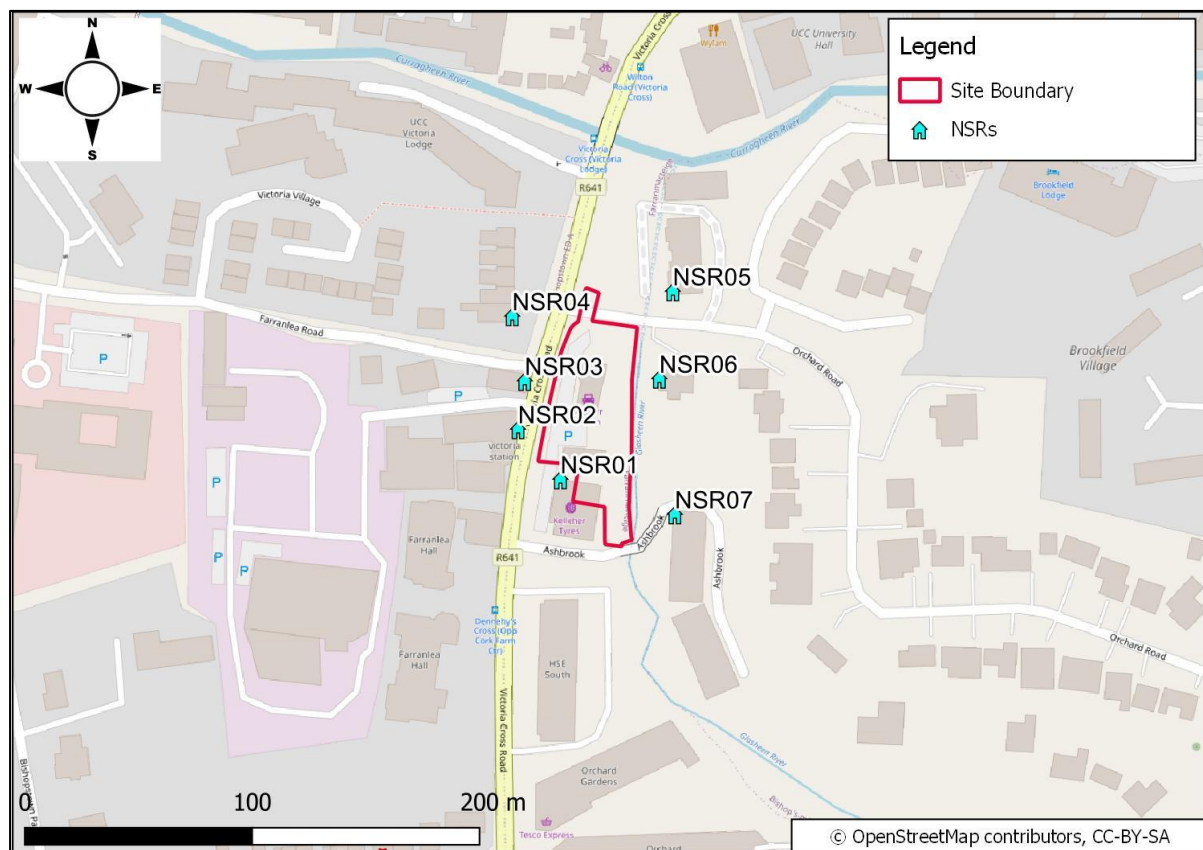
- **Low to Medium Risk**, refer to Section 2.4.3 above.

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      |   |
| NSR01 | 565145 | 571063 | Student Accommodation Planning Reference 19/38385 |
| NSR02 | 565127 | 571085 | Commercial - Victoria Station                     |
| NSR03 | 565130 | 571106 | Commercial - Dental Surgery                       |
| NSR04 | 565124 | 571135 | Residential                                       |
| NSR05 | 565195 | 571146 | Residential Apartments                            |
| NSR06 | 565189 | 571107 | Residential                                       |
| NSR07 | 565196 | 571048 | Residential Apartments                            |

## 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 A, therefore the following threshold values will apply at NSRs:

- Daytime (07:00-19:00) and Saturday (07:00-13:00) 65dB
- Evening (19:00 – 23:00) and weekends (07:00 – 23:00 Sunday) 55dB
- Night-time (23:00-07:00) 45dB

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 (CFA))           | 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  $L_{Aeq,1hour}$  65dB 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 (CFA) during the piling works will ensure the proposed development will not cause vibration giving rise to structural or cosmetic damage at nearby properties.

#### 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.

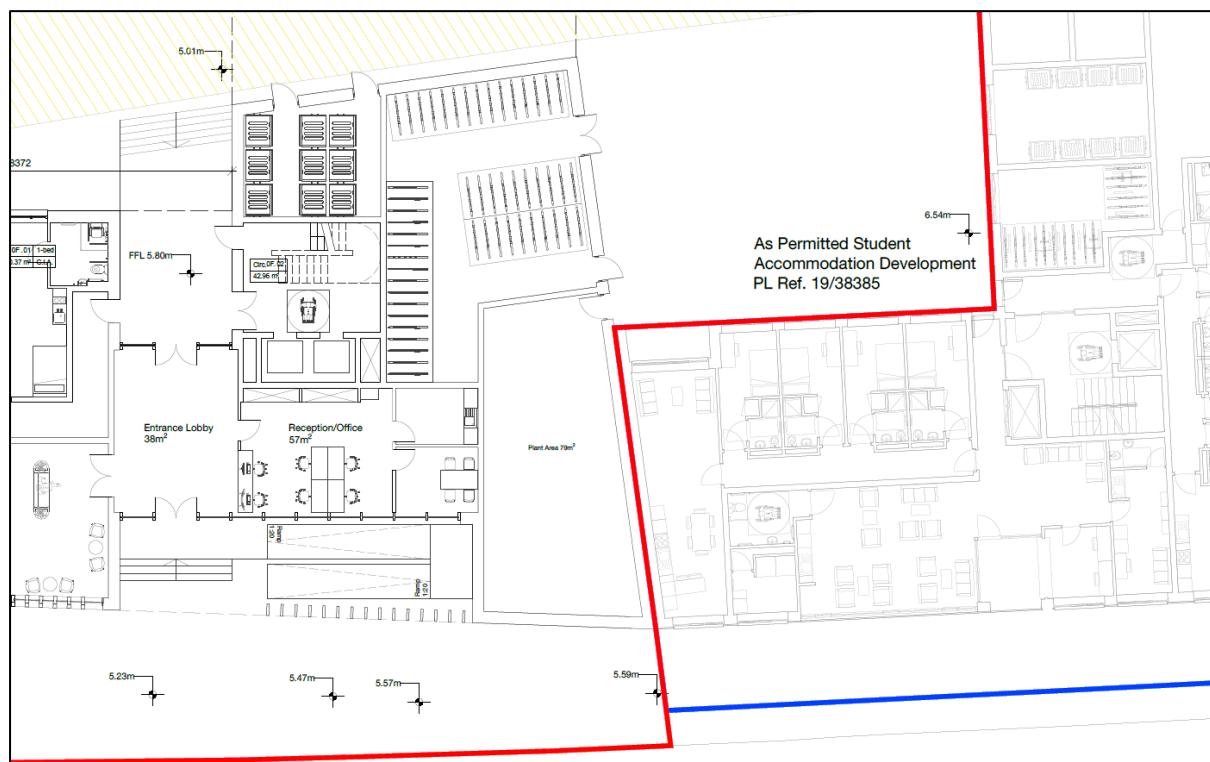
#### 4.2 Operational Phase

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

Plant Room (ground floor)

The Plant room is located on the ground floor as shown in Figure 4-2 below. The room will be built within a blockwork construction with insulated walls to reduce noise transmission through the walls and ceiling. A louvred door will be present, this will be acoustically rated to ensure noise emission from the plant room to the surrounding environment is 10dB lower than ambient  $L_{A90,T}$  values at 10m.

**Figure 4-2: Location of Plant Room**



The associated noise emission from the plant room will be significantly below (i.e. more than 10dB difference) the night-time 45dB to 60dB  $L_{Aeq,T}$  value utilised in determining the buildings sound reduction from the external to internal environments, refer to Section 4.3 below.

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 Student 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 Victoria Cross Road and the N22.

Although congregation of students 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 students 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 8 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.

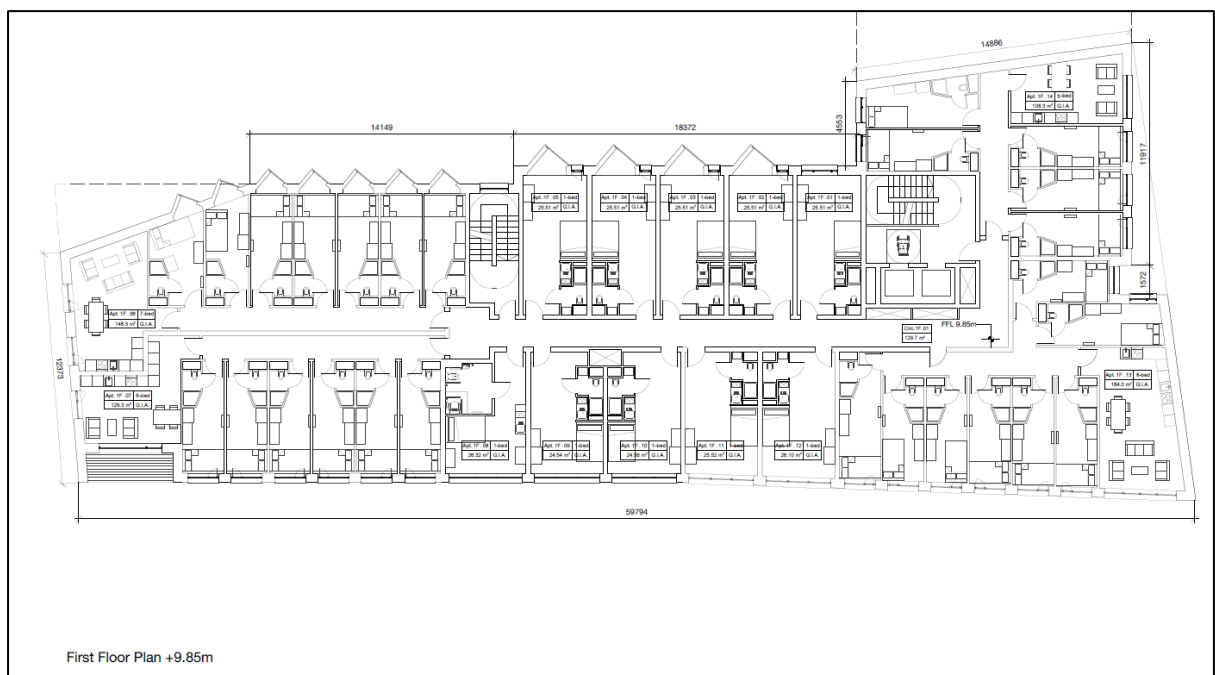
#### **Noise at Source**

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

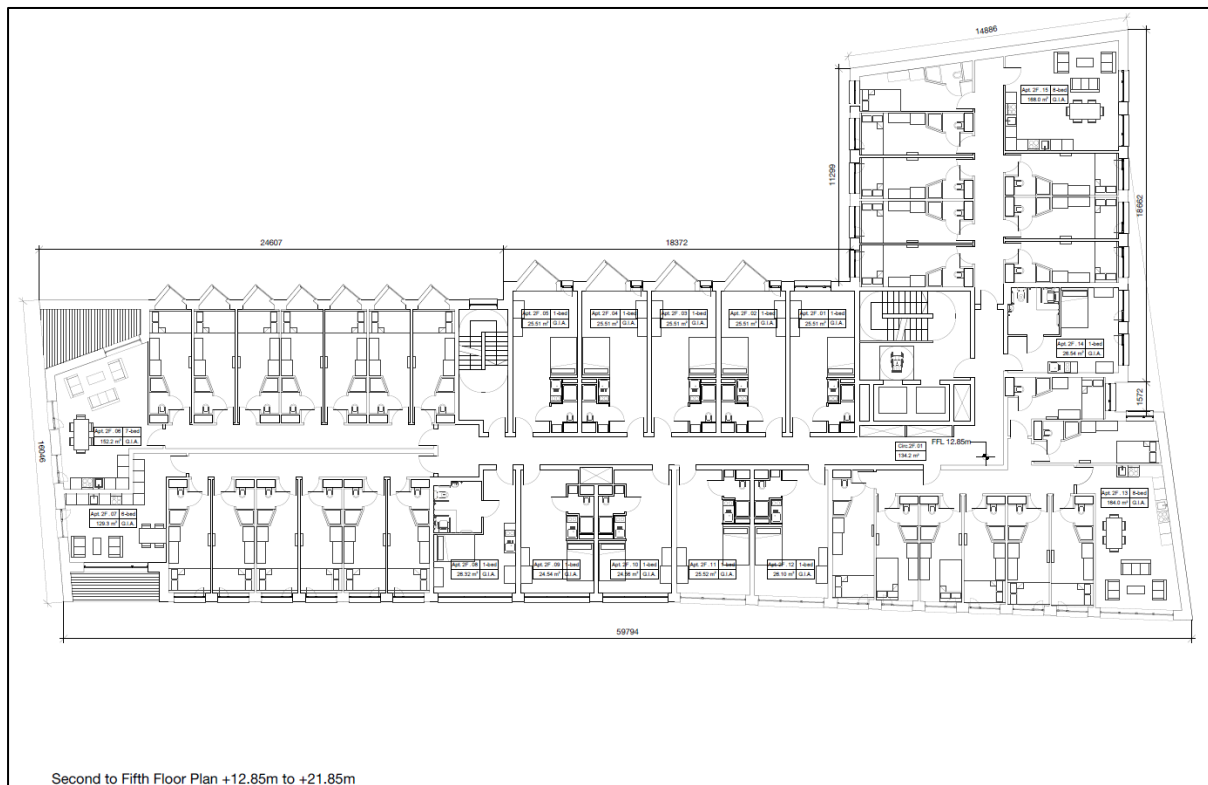


Ground floor levels are shown in Figure 4-3 below. Floor 1 and floors 2-5 are shown in Figure 4-4 and Figure 4-5 respectively.

### Figure 4-4: 1st Floor Layouts



**Figure 4-5: 2nd to 5th Floor Layouts**

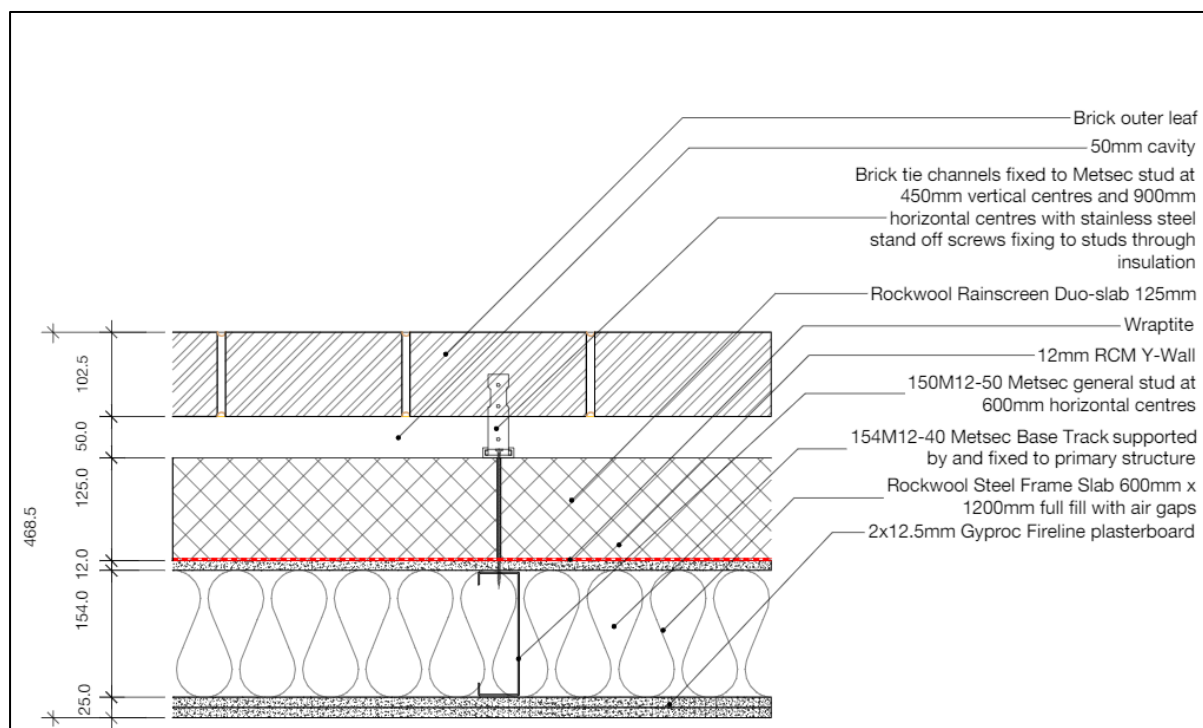


Within the higher floors, accommodation units are present on the east and west wings, though external spaces on the western wing, facing onto the Victoria Road are reduced spaces, minimising the functional use of the space.

### 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 4-6: External Wall Construction**



The sound insulation performance of the glazing and ventilation systems in proximity to the R641/Victoria Cross Road will be upgraded to achieve the internal acoustic environmental criteria outlined in Table 2-3 with the windows derived from external traffic noise.

### External Amenity Area

ProPG recommend that external amenity areas should not be above the range of 50-55dB  $L_{Aeq,16hour}$ .

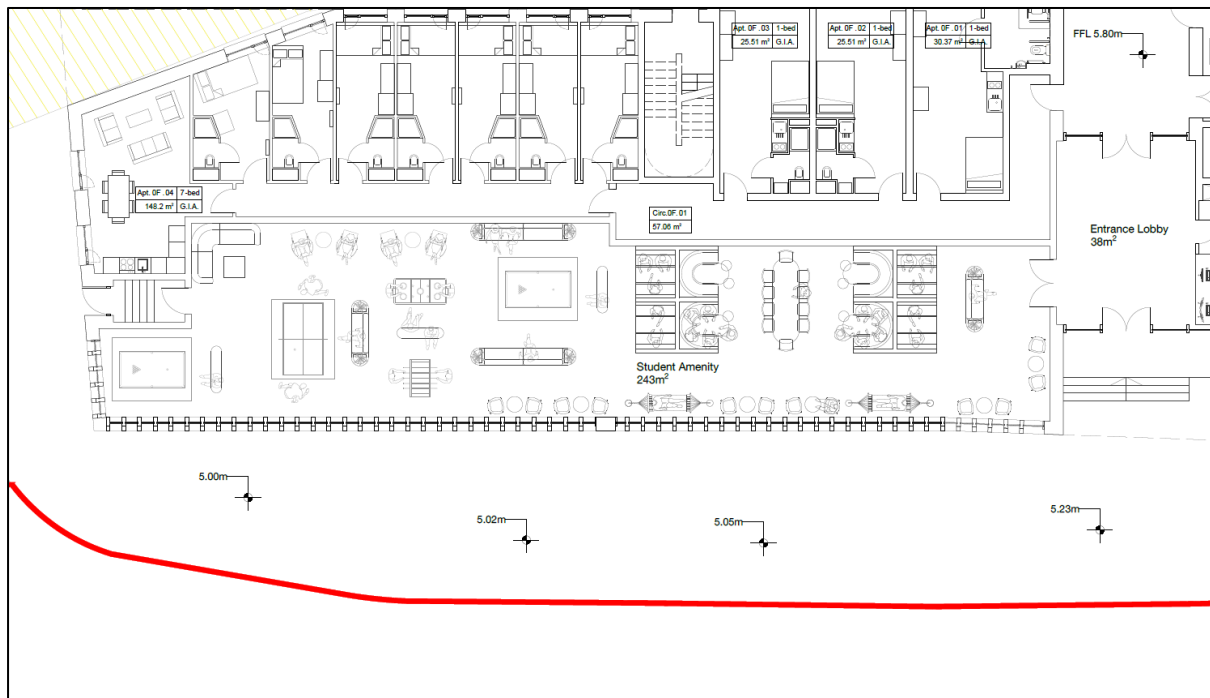
Existing noise levels across the Site currently exceed this. However, the proposed development proposes for the onsite amenity to form part of the ground floor (internally), refer to Figure 4-7 below and towards the centre of the roof area, refer to Figure 4-8 below.

The ground floor amenity area will enable the external building fabric to minimise internal break in and thereby provide an acoustically comfortable environment.

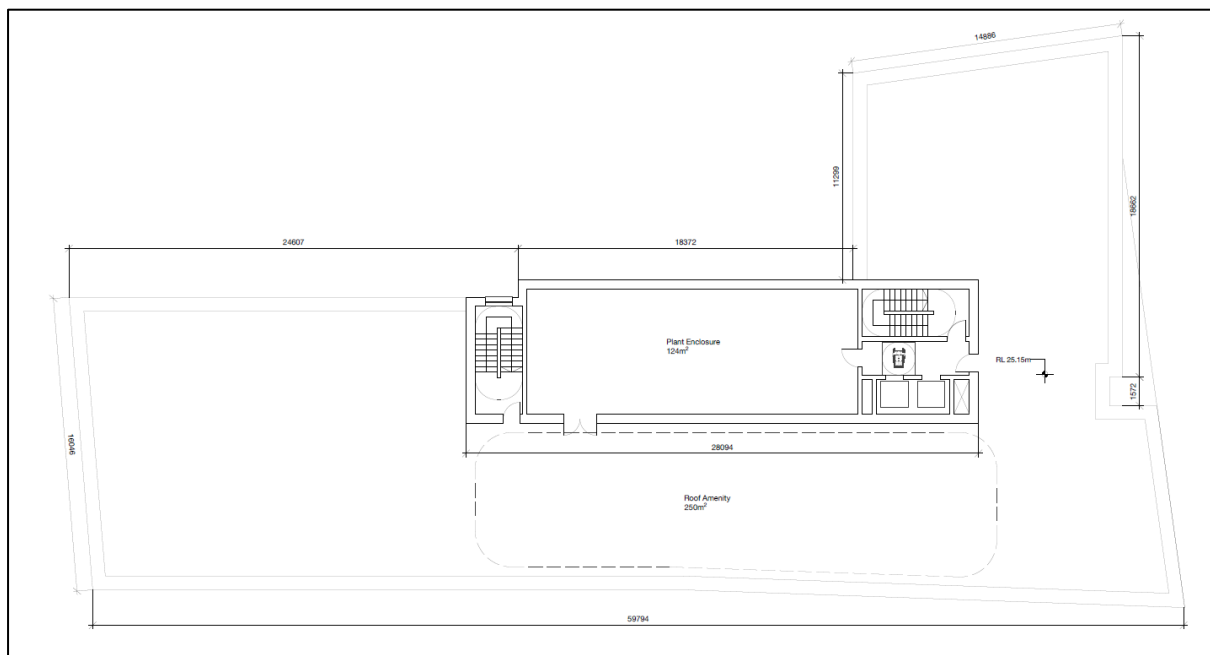
The roof top amenity will be protected from road traffic noise by the height of the building and the set-back of the amenity area from the building edge, providing the building as a barrier effect to road traffic noise. Typical barrier effects will provide up to 10dB, as per BS5228 [11], which will ensure the amenity area is within the range of 50 to 55dB  $L_{Aeq,16hours}$ .

With the presence of the roof top plant area, the louvre around this plant will be specified to ensure the amenity area is acoustically protected from any internal plant noise, and that the cumulative sound level within the amenity roof top is maintained below  $L_{Aeq,16hour}$  of 55dB.

**Figure 4-7: Site Layout Showing the Internal Amenity Along the Western Boundary**



**Figure 4-8: Roof Layout Showing Rooftop Amenity**



### 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><br>102.5mm brick, 50mm cavity, 125mm Duo slab or similar. | >50                            |
| <b>External Glazing:</b><br>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 (western façade) 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) |
| Western façade | First Floor | 64                          | 60         | 37 (upgraded windows closed)          | 27   | 23                      |

The highest sound levels predicted on the Site are derived from the  $L_{den}$  strategic noise mapping and the night time ambient monitoring:

- $L_{den}$  64dB and
- $L_{Aeq,T}$  Night-time 60dB.

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 64dB will be reduced to an internal level of less than 35dB and the night-time external noise level of 60dB will be reduced to an internal level of less than 30dB, which complies with the lowest criteria as defined within World Health Organisation and BS8223 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 34dB during the daytime and <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.49dB during the daytime and ca.45dB during the night-time which exceed ProPG recommended internal  $L_{Aeq}$  levels. The key criteria are to ensure the rooms can be comfortably lived within with the windows closed. The ability to open the windows for occupants' personal preference (non-acoustic likely) will present a higher internal noise value, but this is an option the design cannot mitigate.

## Ventilation

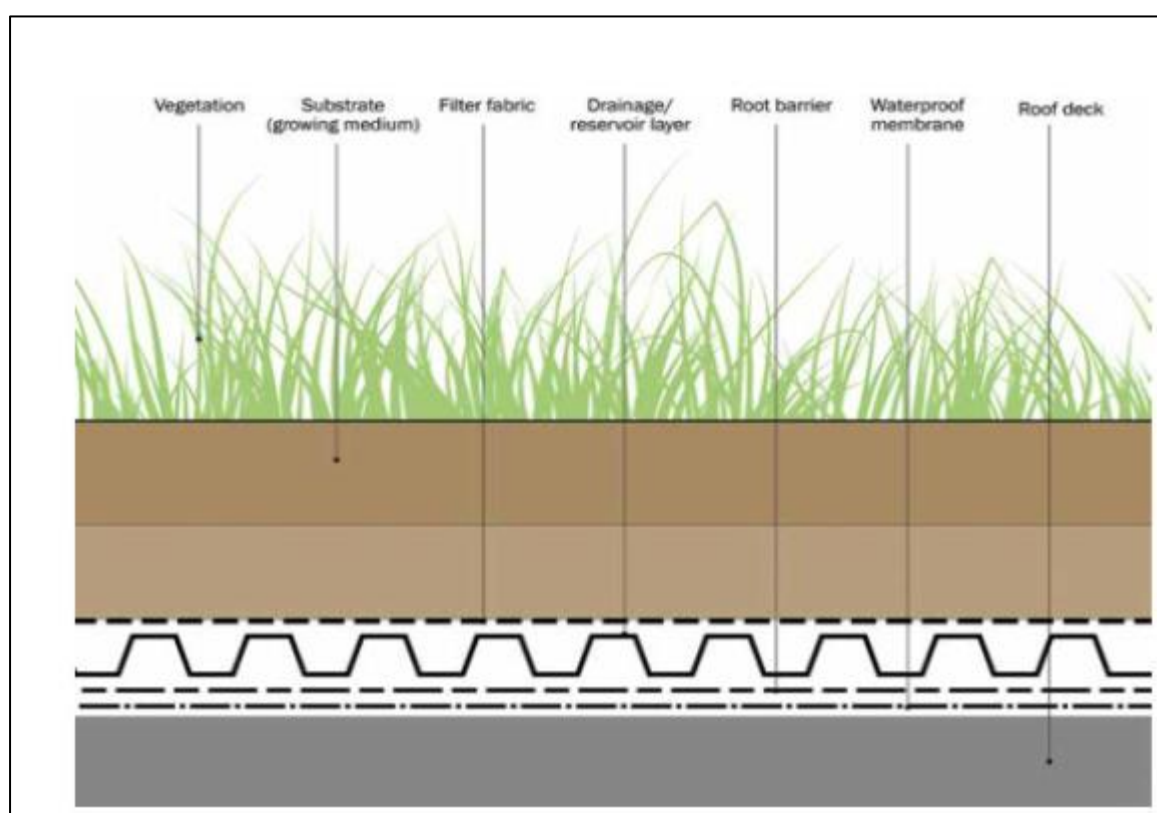
Trickle vents will be present in all external glazing of living areas, these will be required to have a sound reduction of  $\geq 37$  dBA.

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 37 dB. All ducting shall be installed to ensure no vibrational borne noise occurs within the building.

## Roof

The roof makeup comprising a green roof design, will achieve a sound reduction in excess of  $\geq 37$  dBA, refer to Figure 4-9 below.

**Figure 4-9: Indicative Roof Makeup**



Passive and mechanical air vents, if needed on roof tops, shall incorporate acoustically rated baffle filters or similar to ensure break-in from external noise is reduced by a minimum of 37 dB R'w internally. All ducting shall be installed to ensure negligible vibrational borne noise occurs within the building.

### 4.3.4 Element 3: – Assessment of Other Relevant Issues

Element 3 of Stage 2 details other issues which may be considered relevant to the assessment which are:

- Compliance with relevant national and local policy;
- 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, amenity areas are within the ground floor area and are predicted to be within compliance with ProPG recommended range.

## **Likely Occupants of the Development**

The proposed development will be occupied by students for the academic year and the full year with research students.

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 near 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 Victoria Cross Road/R641. 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 55dB to 63dB  $L_{Aeq,T}$  for the daytime and 52dB to 65dB  $L_{Aeq,T}$  for the night-time hours.
- Strategic round three noise maps show the  $L_{DEN}$  ranges from 55dB to 64dB across the Site and  $L_{night}$  ranges from 45dB to 59dB with higher contour bands closer to the Victoria Cross Road.
- The baseline monitoring is therefore in line with the predicate 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).
- A Stage 1 initial noise risk assessment for the Site determined the Site was a low to medium risk due to traffic noise from the R641/Victoria Cross Road.
- 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.
- Through acoustic design outlined within this report the proposed development would enable internal and external noise levels to be achieved as per ProPG and BS 8233.



## REFERENCES

- [1] Association of Noise Consultants (ANC), Institute of Acoustics (IOA )and Chartered Institute of Environmental Health (CIEH), “The Professional Practice Guidance on Planning and Noise (ProPG),” 2017.
- [2] BSI, BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound provides a method of assessing the impact of a source of industrial or commercial sound, BSI, 2019.
- [3] B. S. Institution, “BS 8233:2014 Guidance on sound insulation and noise reduction for buildings,” 2014.
- [4] World Health Organization, “Night Noise Guidelines for Europe,” WHO, 2009.
- [5] B. J. Smith, R. J. Peters, Stephanie Owen, “Acoustics and Noise Control,” 1996.
- [6] ISO, ISO 9613-2:2017: Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation, ISO, 2017.
- [7] ISO, “9613-1:1993 Acoustics — Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere,” 1996.
- [8] ISO, ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise Part 1: Basic quantities and assessment procedures, Geneva: ISO, 2016.
- [9] ISO, ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels, Switzerland: International Organization for Standardization, 2017.
- [10] EPA, “Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4),” 2016.
- [11] British Standard, BS 5228-1:2009+A1 2014 Code of practice for noise and vibration control on construction and open sites. Noise, London: BS, 2009.
- [12] Council, Cork City, “Cork City Development Plan 2015-2021,” Cork City Council, 2015.
- [13] Councils, Cork City and Cork County, “CORK AGGLOMERATION AREA Noise Action Plan 2018-2023,” 2018.
- [14] Environmental Protection Agency, “GIS Noise Mapping,” [Online]. Available: <https://gis.epa.ie/EPAMaps/>. [Accessed 09 02 2021].
- [15] World Health Organization, “Guidelines for community noise,” 1999.

# APPENDICES



# APPENDIX A

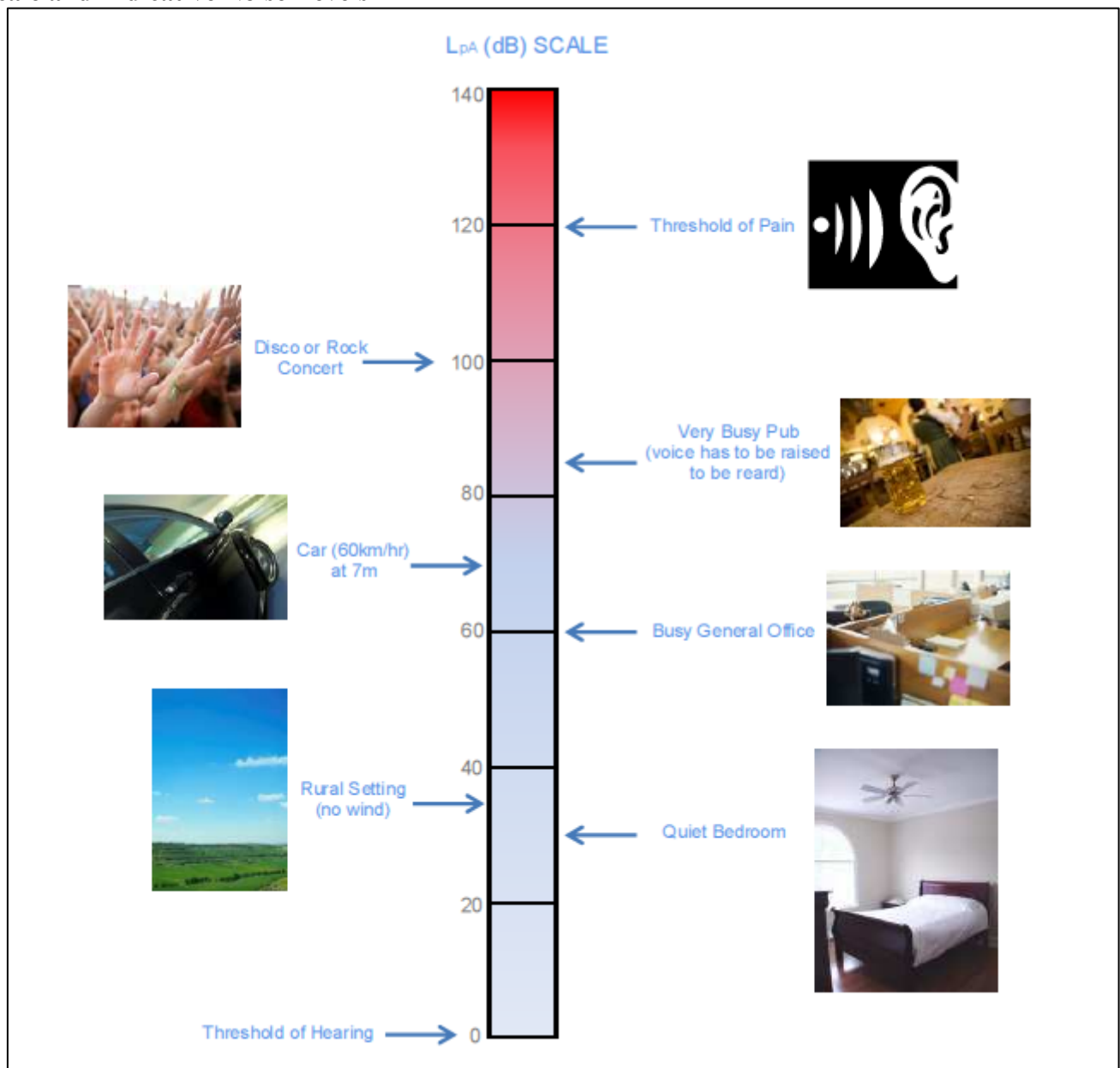


## **Glossary of Acoustic Terminology**

| <b>Abbreviation / Descriptor</b> | <b>Description</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.  |
| LAmx                             | The maximum RMS A-weighted sound pressure level occurring within a specified time period.   |
| Lden                             | <p>Day-evening-night equivalent level, calculated as:</p> $L_{den} = 10 \log \frac{1}{24} \left( 12 * 10^{\frac{L_{day}}{10}} + 4 * 10^{\frac{L_{evening} + 5}{10}} + 8 * 10^{\frac{L_{night} + 10}{10}} \right)$ <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