REPORT



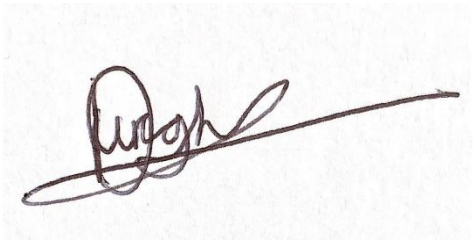
Old Fort Road – Inward Noise Impact Assessment

CLIENT	DOCUMENT REFERENCE	DATE
O'Flynn Construction	257501.1076NR01b	24 April 2026

DOCUMENT CONTROL SHEET

Document Control Sheet	
Our Reference	257501.1076NR01b
Original Issue Date	13 March 2026
Client:	O'Flynn Construction
Client Address:	Beckett House, Barrack Square, Ballincollig, Co. Cork

Revision	Revision Date	Description
A	01 April 2026	Assessment updated with new site plans.
B	24 April 2026	Construction Noise Assessment added.

Details	Written by	Approved by
Signature		
Name	Dylan Floyd	Dominic Wright
Title	Acoustic Consultant	Senior Acoustic Consultant
Date	24 April 2026	24 April 2026

Disclaimer
This report considers the specific instructions and requirements of our client. It is not intended for third-party use or reliance, and no responsibility is accepted for any third party. The provisions in this report apply solely to this project and should not be assumed applicable to other developments without review and modification.

ENVIRONMENT
I.S. EN ISO 14001:2015
NSAI Certified

HEALTH & SAFETY
I.S. ISO 45001:2018
NSAI Certified

QUALITY
I.S. EN ISO 9001:2015
NSAI Certified

TABLE OF CONTENTS

1. INTRODUCTION 2-1

2. RELEVANT CRITERIA AND GUIDANCE 2-3
2.1 Cork Agglomeration Noise Action Plan 2024-2028 2-3
2.2 ProPG: Planning & Noise 2-3
2.3 British Standard BS 8233:2014 2-6
2.3.1 Internal Noise 2-6
2.3.2 External Noise 2-7
2.4 Criteria for Assessing Construction Noise Impacts 2-7
2.4.1 Construction Noise 2-7
2.4.2 Construction Vehicular Traffic 2-8
2.5 Criteria for Assessing Construction Vibration Impacts 2-9

3. BASELINE ENVIRONMENT 3-11
3.1 Baseline Survey 3-11
3.1.1 Survey Locations and Periods 3-11
3.1.2 Survey Equipment and Personal 3-12
3.1.3 Measurement Parameters 3-13
3.2 Survey Results 3-13
3.2.1 2019 Survey Results 3-13
3.2.2 2026 Survey Results 3-15
3.2.3 Unattended Noise Survey 3-15
3.3 Noise Risk Assessment Conclusion 3-17

4. STAGE 2 – FULL ACOUSTIC ASSESSMENT 4-19
4.1 Element 1 – Good Acoustic Design (GAD) Process 4-19
4.1.1 ProPG Guidance 4-19
4.1.2 Application of GAD Process to Proposed Application 4-19
4.2 Element 2 – Internal Noise Levels 4-21
4.3 Element 3 – External Amenity Areas 4-23
4.4 Element 4 – Assessment of Other Relevant Issues 4-23
4.4.1 Compliance with Relevant National and Local Policy 4-24
4.4.2 Magnitude and Extent of Compliance with ProPG 4-24
4.4.3 Likely Occupants of the Development 4-24
4.4.4 Acoustic Design v Unintended Adverse Consequences 4-24
4.4.5 Acoustic Design v Wider Planning Objectives 4-24

5. CONSTRUCTION NOISE ASSESSMENT 5-25
5.1 Predicted Impacts of the Proposed Development 5-25
5.1.1 Sensitive Receptors 5-25
5.2 Mitigation Measures 5-29
5.2.1 Selection of Quiet Plant 5-29
5.2.2 Noise Control at Source 5-29
5.2.3 Screening 5-30
5.2.4 Liaison with the Public 5-30
5.3 Residual Impacts 5-30
5.3.1 Construction Noise 5-30
5.3.2 Construction Phase Traffic Noise 5-31
5.3.3 Construction Phase Vibration 5-31

6. CONCLUSION **6-32**

APPENDIX A. GLOSSARY OF ACOUSTIC TERMINOLOGY **A-1**

LIST OF TABLES

Table 2-1 Indoor Ambient Noise Levels for Dwellings from BS8233:2014 2-6

Table 2-2 Example Threshold of Significant Effect at Dwellings 2-7

Table 2-3 Construction Noise Signifiance Ratings. 2-8

Table 2-4 Likely Effect Associated with Change in Traffic Noise Level – Construction. 2-8

Table 2-5 Recommended construction vibration thresholds for buildings 2-9

Table 2-6 Guidance on effects of human response to PPV magnitudes 2-10

Table 3-1 Noise Survey Location Descriptions and Periods 3-12

Table 3-2 Survey Equipment Details 3-12

Table 3-3 Noise Monitoring Results at Location ASL1 (2019) 3-13

Table 3-4 Noise Monitoring Results at Location ASL2 (2019) 3-13

Table 3-5 Summary of USL1 Measured Noise Levels (2019) 3-13

Table 3-6 Noise Monitoring Results at Location AT01 3-15

Table 3-7 Noise Monitoring Results at Location AT02 3-15

Table 3-8 Summary of Noise Results at Location UN01 3-15

Table 3-9 Summary of Noise Results at Location UN02 3-16

Table 3-10 Categorising Proposed Site 3-17

Table 4-1 Assumed Sound Power Values for WWTP 4-21

Table 4-2 Summary of Predicted Northern Facade Noise Levels 4-22

Table 4-3 Summary of Measured Southern Facade Noise Levels 4-22

Table 4-4 External Noise Levels Required to Achieve Internal Noise Levels 4-22

Table 5-1 Construction Noise Levels at Varying Distances 5-27

Table 5-2 Construction Noise Levels at Varying Distances Post Mitigation Measures 5-31

1. INTRODUCTION

AWN Consulting has been requested by McCutcheon Planning on behalf of their client O'Flynn Construction to conduct a noise impact assessment on the proposed residential development at Old Fort Road, Ballincollig, Co. Cork. AWN Consulting previously issued an inward noise impact report (Ref. 19_11201NR03) in 2019 as part of the development's earlier planning application. The baseline noise survey from that report has been referred to within this assessment, along with a new updated baseline noise survey carried out from 2–3 March 2026.

The updated version of this report also includes a construction noise impact assessment.

Figure 1-1 presents the proposed development location with an approximate red line boundary and the surrounding area.

Figure 1-1 Location of Proposed Development

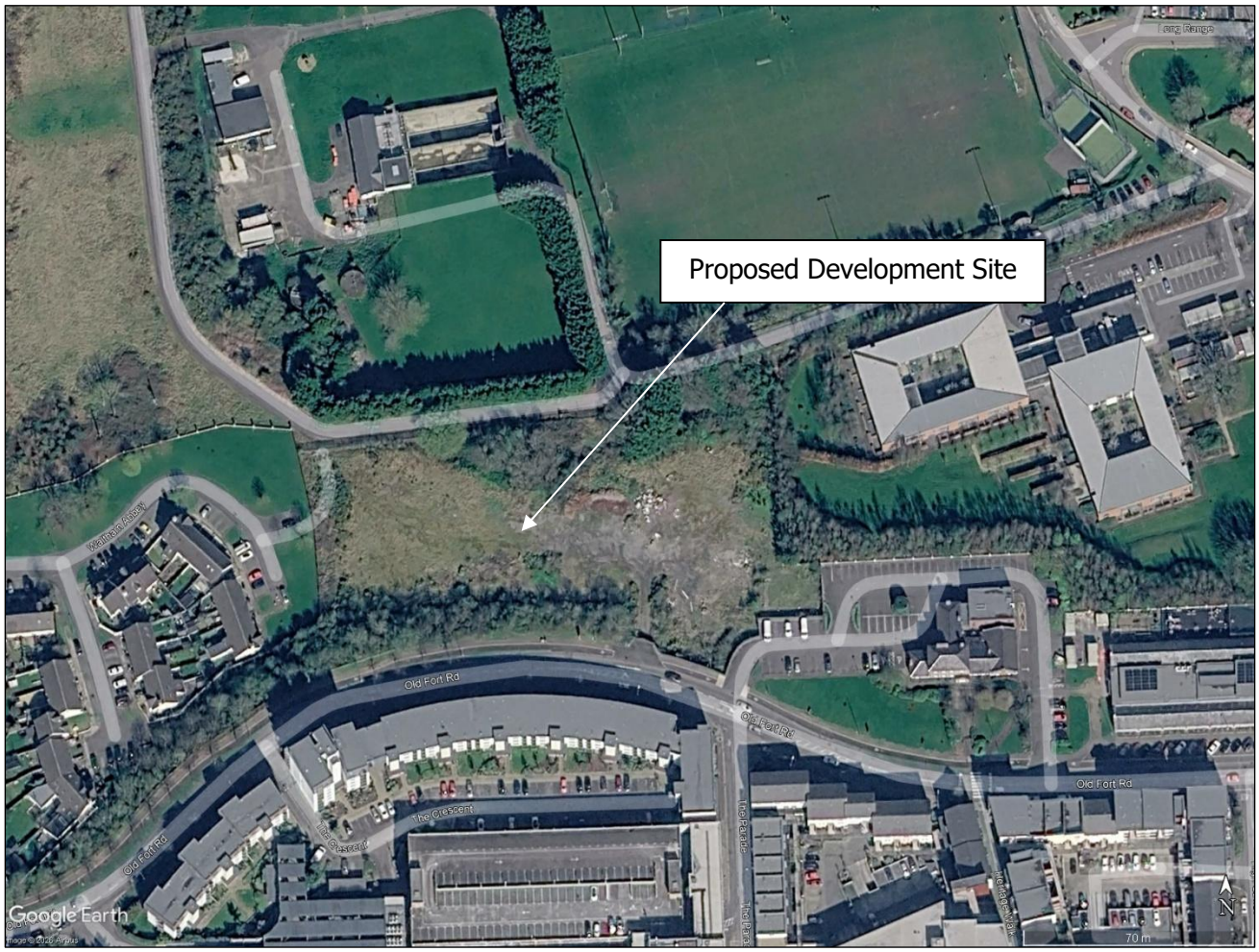


Figure 1-2 presents the outline site plan, illustrating the revised apartment block layout that forms part of this planning application.

Figure 1-2 Site Plan Development



The Proposed development consists of 3 apartment blocks:

- Block A – 47 units
- Block B – 57 units
- Block C – 53 units

The first purpose of this report is to assess the impact of environmental noise on the façades of the proposed development, evaluate potential noise intrusion, and, where necessary, recommend appropriate mitigation measures.

The second purpose of this report is to complete a construction noise assessment for the construction phase of the project.

In the first instance it is considered appropriate to review relevant noise criteria being adopted for the assessment and to present a discussion of the site in the context of the existing noise environment.

Appendix A presents a glossary of acoustic terminology that is used throughout this report.

2. RELEVANT CRITERIA AND GUIDANCE

2.1 Cork Agglomeration Noise Action Plan 2024-2028

The Cork Agglomeration Noise Action Plan 2024-2028 states the following with respect to assessing the noise impact on new residential developments.

> *The Draft Interim National Guidance for the Consideration of Transportation Noise in the Design of New Residential Development (2021) (described in Section 2.3.12), which the Local Authorities have cognisance of, recommends that consideration is given to the potential impact of transportation noise in line with Professional Planning Guidance (ProPG) on Planning & Noise: New Residential Development (ProPG, 2017).*
>
> *ProPG was published in May 2017 by the Acoustics and Noise Consultants (ANC), Chartered Institute of Environmental Health and UK Institute of Acoustics (IOA). Its primary goal is to aid in planning to deliver sustainable development by promoting good health and well-being in relation to noise. It encourages the use of good acoustic design process in and around proposed new residential development, having regard to national policy.*
>
> *Any issues related to noise should be given consideration at the earliest stages of the development process to facilitate streamlined decision making in planning. ProPG follows a systematic, proportionate, risk based, two-stage, approach.*
>
> *Stage One is an Initial Site Noise Risk Assessment which should be conducted to establish the level of risk from noise, not including any mitigation measures. There are four noise risk categories (negligible, low, medium and high). The outcome of this assessment should not directly inform a decision, rather to allow for the consideration of good acoustic design.*
>
> *Stage Two is a full noise assessment including four recommended key elements:*
>
> *• 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".*
>
> *To support proposals for a development an Acoustic Design Statements should be produced which will aid recommendations formulated by the decision maker.*

2.2 ProPG: Planning & Noise

The Professional Guidance on Planning & Noise: New Residential Development (ProPG) and associated supplementary documents were published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a government document, since its adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk based 2 stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,
- Stage 2 – Involves a full detailed appraisal of the proposed development covering four "*key elements*" that include:

    - Element 1 - Good Acoustic Design Process;
    - Element 2 - Noise Level Guidelines;
    - Element 3 - External Amenity Area Noise Assessment
    - Element 4 - Other Relevant Issues

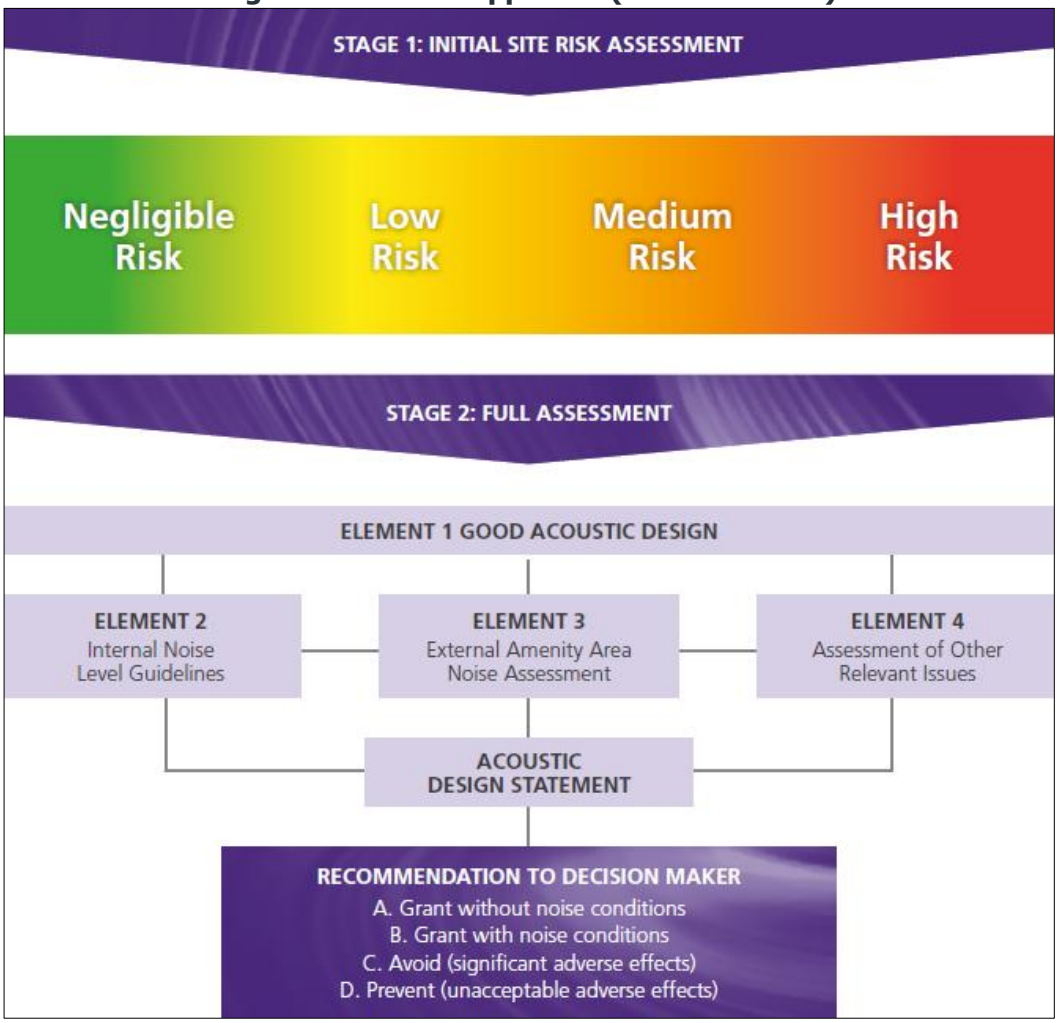
A key component of the evaluation process is the preparation and delivery of an Acoustic Design Statement (ADS) which is intended for submission to the planning authority. This document is intended to clearly outline the methodology and findings of the Stage 1 and Stage 2 assessments, so as the planning authority can make an informed decision on the permission. ProPG outlines the following possible recommendations in relation to the findings of the ADS:

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

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

A summary of the ProPG approach is illustrated in Figure 2-1.

Figure 2-1 ProPG Approach (Source: ProPG)



The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium, or high risk based on the pre-existing noise environment. Figure 2-2 presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Paragraph 2.9 of ProPG states that,

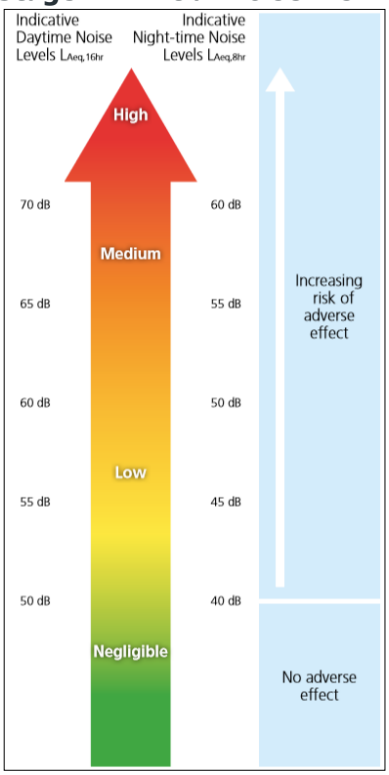
> *"The noise risk assessment may be based on measurements or prediction (or a combination of both) as appropriate and should aim to describe noise levels over a "typical worst case" 24 hour day either now or in the foreseeable future."*

ProPG states the following with respect to the initial risk assessment,

> *"The risk assessment should not include the impact of any new or additional mitigation measures that may subsequently be included in development proposals for the site and proposed as part of a subsequent planning application. In other words, the risk assessment should include the acoustic*

effect of any existing site features that will remain (e.g. retained buildings, changes in ground level) and exclude the acoustic effect of any site features that will not remain (e.g. buildings to be demolished, fences and barriers to be removed) if development proceeds."

Figure 2-2 ProPG Stage 1 - Initial Noise Risk Assessment



2.3 British Standard BS 8233:2014

2.3.1 Internal Noise

There are no statutory guidelines or specific local guidelines relating to appropriate internal noise levels in dwellings. In this instance, reference is made to BS 8233: 2014: *Guidance on sound insulation and noise reduction for buildings.*

BS 8233 sets out recommended internal noise levels for several different building types from external noise sources such as traffic. The guidance is primarily for use by designers and hence BS 8233 may be used as the basis for an appropriate schedule of noise control measures. The recommended indoor ambient noise levels for residential dwellings and other spaces are set out in Table 2-1.

Table 2-1 Indoor Ambient Noise Levels for Dwellings from BS8233:2014

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

2.3.2 External Noise

BS 8233 also provides desirable noise levels for external amenity areas such as gardens, patios, and balconies. It states:

> *"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."*

2.4 Criteria for Assessing Construction Noise Impacts

2.4.1 Construction Noise

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

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

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

This document sets out a Construction Noise Threshold (CNT) relative to the existing noise environment. Table 2-2 sets out the approach.

Table 2-2 Example Threshold of Significant Effect at Dwellings

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

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

For the appropriate assessment period (i.e. daytime in this instance), the ambient noise level is determined and rounded to the nearest 5 dB. If the construction noise exceeds the appropriate category value, then a significant effect is deemed to occur. It should be noted that this assessment method is only valid for residential properties and if applied to commercial premises without consideration of other factors may result in excessively onerous thresholds being set.

Proposed Threshold Levels for Noise

The proposed general construction hours are 07:00 to 18:00 hrs, Monday to Friday and 08:00 to 14:00 hrs on Saturdays. No working will be allowed on Sundays and Public Holidays. Taking into account the document outlined above (BS 5228-1:2009+A1:2014) and making reference to the baseline noise environment monitored around the development site (see Section 3), the Category A threshold from the ABC methodology is applied to all noise sensitive locations surrounding the site. This classification will be explained further in Section 5. The category A thresholds within Table 2-2 will apply for the proposed working hours.

Interpretation of the Construction Noise Levels (CNL)

In order to assist with interpretation of CNL, Table 2-3 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is taken from Table 3.16 of DMRB: Noise and Vibration (UKHE 2020) and adapted to include the EPA EIAR Guidelines.

Table 2-3 Construction Noise Signifiance Ratings.

Construction Noise Level Per Period	Guidelines for Noise Impact Assessment Significance (DMRB)	EPA EIAR Significance of Effects	Determination
Below or equal to baseline noise level	Negligible	Not Significant	Depending on CNT, duration & baseline noise level
Above baseline noise level and below or equal to CNT	Minor	Slight to Moderate	
Above CNT and below or equal to CNT +5 dB	Moderate	Moderate to Significant	
Above CNT +5 dB	Major	Significant, to Very Significant	

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely impacts during the construction stages.

In accordance with the DMRB Noise and Vibration Guidance, construction noise and construction traffic noise effects shall constitute a significant effect where it is determined that a major or moderate magnitude of effect will occur for a duration exceeding:

- Ten or more days or night in any 15 consecutive day or nights,
- A total number of days exceeding 40 in any six consecutive months

2.4.2 Construction Vehicular Traffic

In order to assist with interpretation of construction traffic noise, Table 2-4 includes guidance as to the likely magnitude of impact associated with changes in traffic noise levels along an existing road. This guidance is taken from Table 3.17 of DMRB: Noise and Vibration (UKHA 2020). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB document.

Table 2-4 Likely Effect Associated with Change in Traffic Noise Level – Construction.

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect

Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant to Slight
3 – 4.9	Perceptible	Moderate	Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

The DMRB guidance outlined above will be used to assess the predicted increases in traffic levels on public roads associated with the Proposed Development and comment on the likely impacts during the construction stage.

2.5 Criteria for Assessing Construction Vibration Impacts

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. For the purpose of the Proposed Development, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

Peak Particle Velocity (PPV)

PPV is commonly used to assess the structural response of buildings to vibration. Reference to the following documents has been made for the purposes of this assessment in order to discuss appropriate PPV limit values:

- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS 5228: 2009 +A1 2014: Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (BS5228-2).

BS7385 and BS5228-2:2009+A1:2014 advise that, for soundly constructed residential properties and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 of BS5228-2:2009+A1:2014 might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges.

The documents note that minor structural damage can occur at vibration magnitudes that are greater than twice those presented in Table 2-5. Major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in the table. It should be noted that these values refer to the vibration at base of the building. Table 2-5 sets out the limits as they apply to vibration frequencies below 4 Hz, where the most conservative limits are required. At higher frequencies, the limit values for transient vibration within Table B.2 of BS5228-2:2009+A1:2014 will apply, with similar reductions applied for continuous vibration and those for protected structures.

Table 2-5 Recommended construction vibration thresholds for buildings

Structure Type	Allowable vibration (in terms of PPV) at closest part of sensitive property to source of vibration, at frequency of ≤4 Hz	
	Transient vibration	Continuous vibration
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s	25 mm/s

Structure Type	Allowable vibration (in terms of PPV) at closest part of sensitive property to source of vibration, at frequency of ≤4 Hz	
	Transient vibration	Continuous vibration
Unreinforced or light framed structures. Residential or light commercial-type buildings	15 mm/s	7.5 mm/s
Protected and Historic Buildings	6 – 15 mm/s	3 – 7.5 mm/s
Identified Potentially Vulnerable Structures and Buildings with Low Vibration Threshold	3 mm/s	
Structure Type	Allowable vibration (in terms of PPV) at closest part of sensitive property to source of vibration, at frequency of ≤4 Hz	

As per BS5228-2:2009+A1:2014, below a frequency of 4 Hz where a high displacement is associated with a relatively low component PPV, a maximum displacement of 0.6 mm (zero to peak) should be used.

Human Perception

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. Higher levels of vibration, however, are typically tolerated for single events or events of short duration. For example, during piling, one of the primary sources of vibration during construction, vibration levels may typically be tolerated at up to 2.5mm/s. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant to such activities during the night-time (or if they are trying to sleep during the daytime).

BS 5228-2 also provides a useful guide relating to the assessment of human response to vibration in terms of the peak particle velocity (PPV). Table 2-6 below summarises the range of vibration values and the associated potential effects on humans.

Table 2-6 Guidance on effects of human response to PPV magnitudes

Vibration Level, mm/s PPV	Description of Effect	Possible Significance Rating
≥10	Vibration is likely to be intolerable for any more than a brief exposure to a level of 10 mm/s	Significant to Very Significant
≥1 to <10	Increasing likelihood of complaints in residential environments but can be tolerated at the lower end of the scale if prior warning and explanation has been given to residents	Moderate to Significant
≥0.3 to <1	Increasing likelihood of perceptible vibration in residential environments	Slight to Moderate
<0.3	Vibration is unlikely to be perceptible in even the most sensitive situations for most vibration frequencies associated with construction	Not significant

Further consideration of where the effect is significant is undertaken using professional judgment based on duration and frequency of the effect, as well as the time of the day.

3. BASELINE ENVIRONMENT

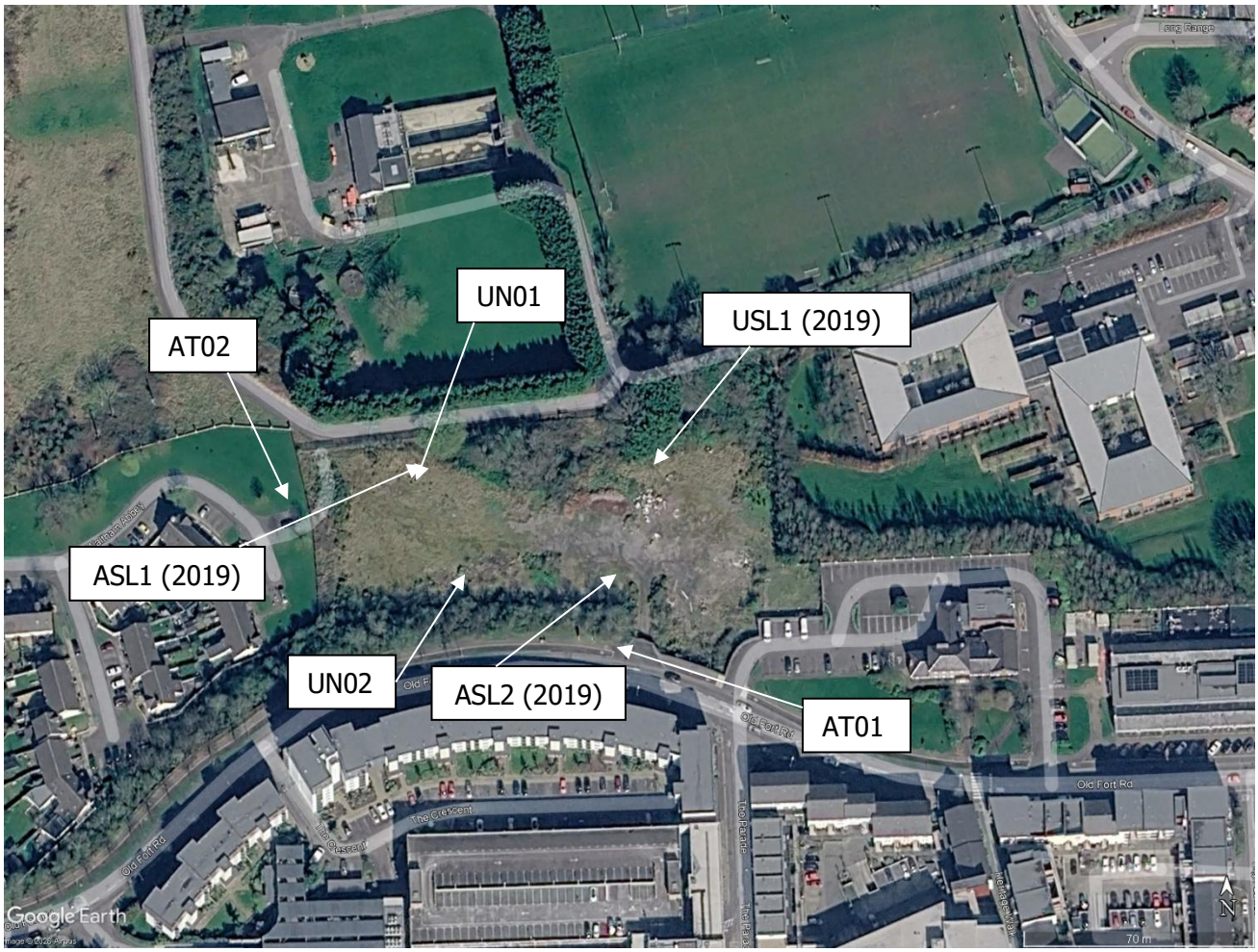
3.1 Baseline Survey

An environmental noise survey was conducted in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996-2: 2017: *Acoustics – Description and measurement and assessment of environmental noise. Part 2 – Determination of sound pressure levels*. Specific details are set out below.

3.1.1 Survey Locations and Periods

The 2019 survey locations, along with the 2026 noise measurement locations selected for the proposed site, are presented in Figure 3-1.

Figure 3-1 Noise Monitoring Locations



The monitoring locations for this survey are described below in Table 3-1.

Table 3-1 Noise Survey Location Descriptions and Periods

Ref	Description	Survey Period
AT01	Attendant noise measurement located at the main entrance to the proposed site located along the Old Fort Road.	12:41-15:07 on the 2nd March 2026
AT02	Attendant noise measurement located with the Waltham Abbey housing estate located to the west of the proposed site.	13:06 – 15:24 on the 2nd March 2026
UN01	Unattended noise measurement located within the proposed site at its north west corner at the area most effected by the waste water treatment plant to the north.	14:25 on the 2nd March – 14:25 on the 3rd March 2026
UN02	Unattended noise measurement located with the proposed development at its southern boundary at the area most effected by the road traffic noise of Old Fort Road	14:15 on the 2nd March – 14:15 on the 3rd March 2026
ASL1	Attended noise measurement located within the proposed site at its north west corner at the area most effected by the waste water treatment plant to the north.	14:07-15:08 on 14th November 2019
ASL2	Attendant noise measurement located at the internal main entrance to the proposed site.	14:35-15:26 14th November 2019
USL1	Unattended noise measurement located to the north east of the proposed site.	14th – 22nd November 2019.

3.1.2 Survey Equipment and Personal

The unattended and attended noise surveys were undertaken by AWN Consulting using Rion NL-52 and NL-53 sound level meters and were calibrated using Bruel & Kjaer Type 4231 calibrator.

Table 3-2 Survey Equipment Details

Equipment	Serial Number	Calibration Date
2026		
Rion NL-52	164426	21/03/2024
	186668	26/06/2025
Rion NL-53	630268	14/10/2025
Bruel & Kjaer Type 4231	2394086	24/06/2025
2019		
Rion NL-52	186671	20/4/2018
Bruel & Kjaer Type 4231	2205805	3/12/2018

For unattended noise surveys, a Rion WS-15 Outdoor Microphone Protection System was used with microphone extension cable and outdoor peli-case.

3.1.3 Measurement Parameters

The following measurement parameters were measured and are discussed within this report.

$L_{Aeq,T}$ is the A-weighted equivalent continuous steady sound level during the sample period and effectively represents an average value over the defined measurement period, T.

$L_{Aeq,16hr}$ refers to the ambient daytime noise level between 07:00 and 23:00hrs and is commonly used to compare rail noise against.

$L_{Aeq,8hr}$ refers to the ambient night-time noise level between 23:00 and 07:00hrs

$L_{A90,T}$ is the A-weighted sound level that is exceeded for 90% of the sample period; generally used to quantify background noise. The T is the sample period the parameter is measured over.

3.2 Survey Results

3.2.1 2019 Survey Results

3.2.1.1 Attended Noise Measurement Results

Location ASL1

Table 3-3 Noise Monitoring Results at Location ASL1 (2019)

Date	Period	Time	Measured Noise Levels, dB		
			L_{Aeq}	L_{AFmax}	L_{A90}
14 November 2019	Day	14:07-14:22	51	63	46
		14:53-15:08	51	60	47

Daytime ambient noise levels were dictated by the Old Fort Road, intermittent local road traffic noise entering the wastewater treatment plant and wind generated noise in the trees. Noise levels were 51dB $L_{Aeq,15min}$ and background noise levels were in the range of 46 to 47dB $L_{A90,15min}$. Road traffic noise was the dominant noise source noted. The wastewater treatment plant was not audible during measurements.

Location ASL2

Table 3-4 Noise Monitoring Results at Location ASL2 (2019)

Date	Period	Time	Measured Noise Levels, dB		
			L_{Aeq}	L_{AFmax}	L_{A90}
14 November 2019	Day	14:35-14:50	54	69	46
		15:11-15:28	54	69	47

Road traffic noise was also dominant at this location. No noise contribution from the wastewater treatment plant was audible during measurements. Noise levels were 54dB $L_{Aeq,15min}$ and background noise levels were in the range of 46 to 47dB $L_{A90,15min}$.

Unattended Noise Measurement Results USL1

Table 3-5 Summary of USL1 Measured Noise Levels (2019)

Day	Sound Pressure Level (dB re. 2x10-5 Pa)					
	Daytime			Night		
	LAeq	LA90	LAFmax	LAeq	LA90	LAFmax
Wed 14th Nov	51	44	72	-	-	-

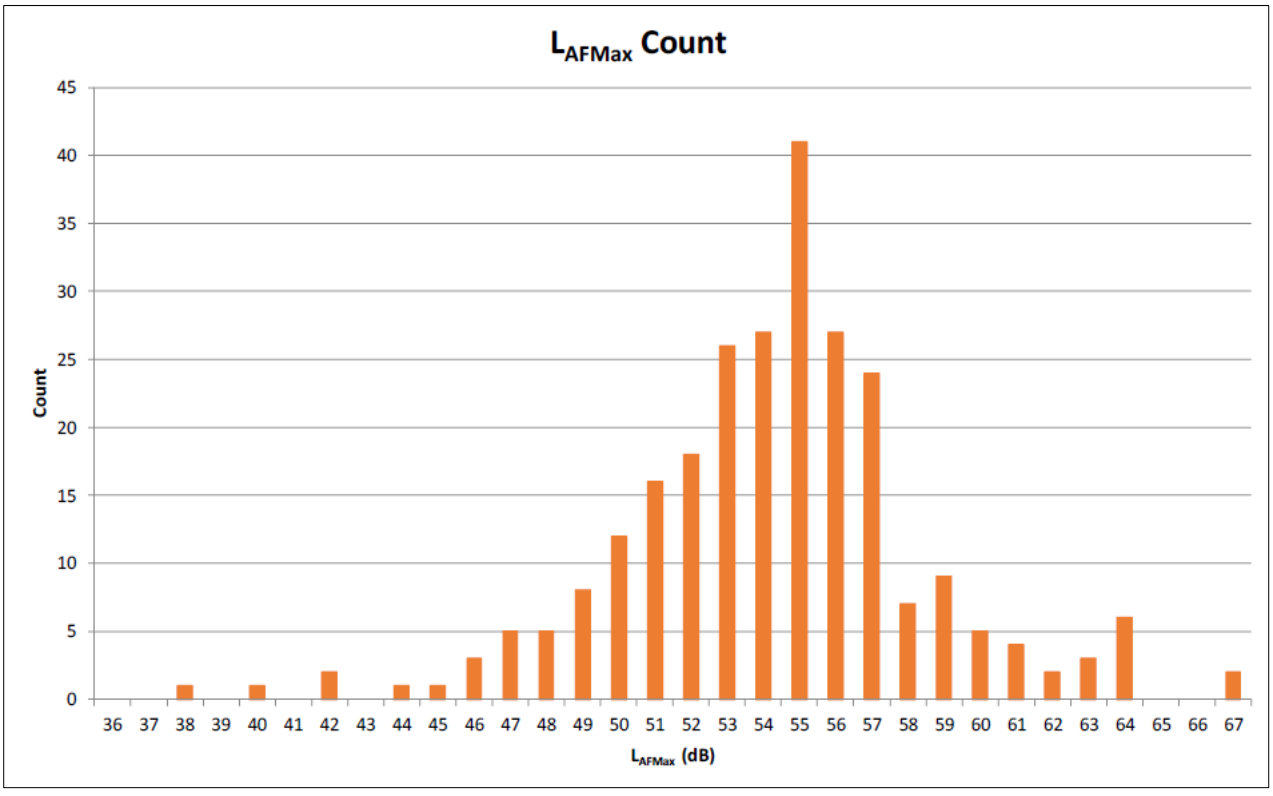
Thurs 15th Nov	51	45	82	41	36	60
Fri 16th Nov	50	42	77	40	35	66
Sat 17th Nov	49	41	78	41	34	61
Sun 18th Nov	51	46	74	39	34	58
Mon 19th Nov	51	46	76	48[a]	40[a]	63[a]
Tues 20th Nov	54[a]	50[a]	77[a]	44	37	63
Wed 21st Nov	52	47	76	46	39	63
Thurs 22nd Nov	52	48	77	44	38	66
Average	51[b]	45[c]	-	43[b]	36[c]	59
Max	52	47	-	46	39	-
Mode	51	46	-	41	34	-
Envelope	52	47	-	46	39	-

e. Elevated rainfall noise levels during night-time period on Monday19th November and daytime period on Tuesday 20th November2019 removed from calculation of noise envelope.
f. Logarithmic average
g. Arithmetic average

Daytime noise levels were found to range between 49 to 52 dB $L_{Aeq,16hour}$, while night-time noise levels fell between 39 to 46 dB $L_{Aeq,8hour}$ with two outliers attributed to poor weather. The primary contributor to noise build-up was road traffic from the Old Fort Road and intermittent local traffic during the daytime period. The wastewater treatment facility was not audible during installation or removal of the equipment; however it is understood that the plant was in operation during the week long monitoring period.

The L_{AFmax} values were measured at 15-minute intervals over the duration of the unattended monitoring survey. Figure 3-2 presents the distribution of the magnitude of L_{AFmax} events during the night period.

Figure 3-2 Number of L_{AFmax} evets at each decibel level measured during the night period at location USL1



During the course of more than a week of monitoring 21 events measured above 60dB L_{AFmax}. No events were measured at or above 80dB L_{AFmax}. Externally the $L_{AFmax,T}$ noise level did not exceed 60dB $L_{Amax,T}$ more than 10 times on any night.

The most commonly occurring L_{AFMax} value is 55dB. Table 5 presents the highest L_{AFMax} value for each night-time period. The arithmetic L_{AFMax} value is 62dB. Only 11 occurrences were above the arithmetic average of 62dB.

3.2.2 2026 Survey Results

3.2.2.1 Attended Noise Survey

The survey results for the attended monitoring locations are presented in the following sections.

3.2.2.2 Location AT01

Table 3-6 presents the noise survey results at location AT01.

Table 3-6 Noise Monitoring Results at Location AT01

Date	Time	Measured Noise Levels (dB)		
		L_{Aeq}	L_{AFmax}	L_{A90}
2nd March 2026	12:41-12:56	70	85	53
	13:26-13:41	70	82	54
	14:52-15:07	70	80	53

The noise monitoring results at location AT01 were dominated by constant road traffic noise from the Old Fort Road. Other audible noise sources in the environment included birdsong, occasional pedestrian noise along the footpath and distant construction noise to the east. Noise levels were 70 dB $L_{Aeq,15min}$ and background noise levels were in the range of 53-54 dB $L_{A90,15min}$.

3.2.2.3 Location AT02

Table 3-7 presents the noise survey results at location AT02.

Table 3-7 Noise Monitoring Results at Location AT02

Date	Time	Measured Noise Levels (dB)		
		L_{Aeq}	L_{AFmax}	L_{A90}
2nd March 2026	13:06-13:21	48	63	42
	14:32-14:47	53	73	43
	15:09-15:24	49	71	43

The noise monitoring results at location AT02 were dominated by constant distant road traffic noise from the Old Fort Road. Other audible noise sources in the environment included birdsong, occasional dog barks and occasional Waltham Abbey local estate traffic. Noise levels were in the range of 48-53 dB $L_{Aeq,15min}$ and background noise levels were in the range of 42-43 dB $L_{A90,15min}$.

3.2.3 Unattended Noise Survey

The survey results for the unattended monitoring locations are presented in the following sections.

3.2.3.1 Location UN01

Table 3-8 presents the measured daytime and night-time noise levels at location UN01.

Table 3-8 Summary of Noise Results at Location UN01

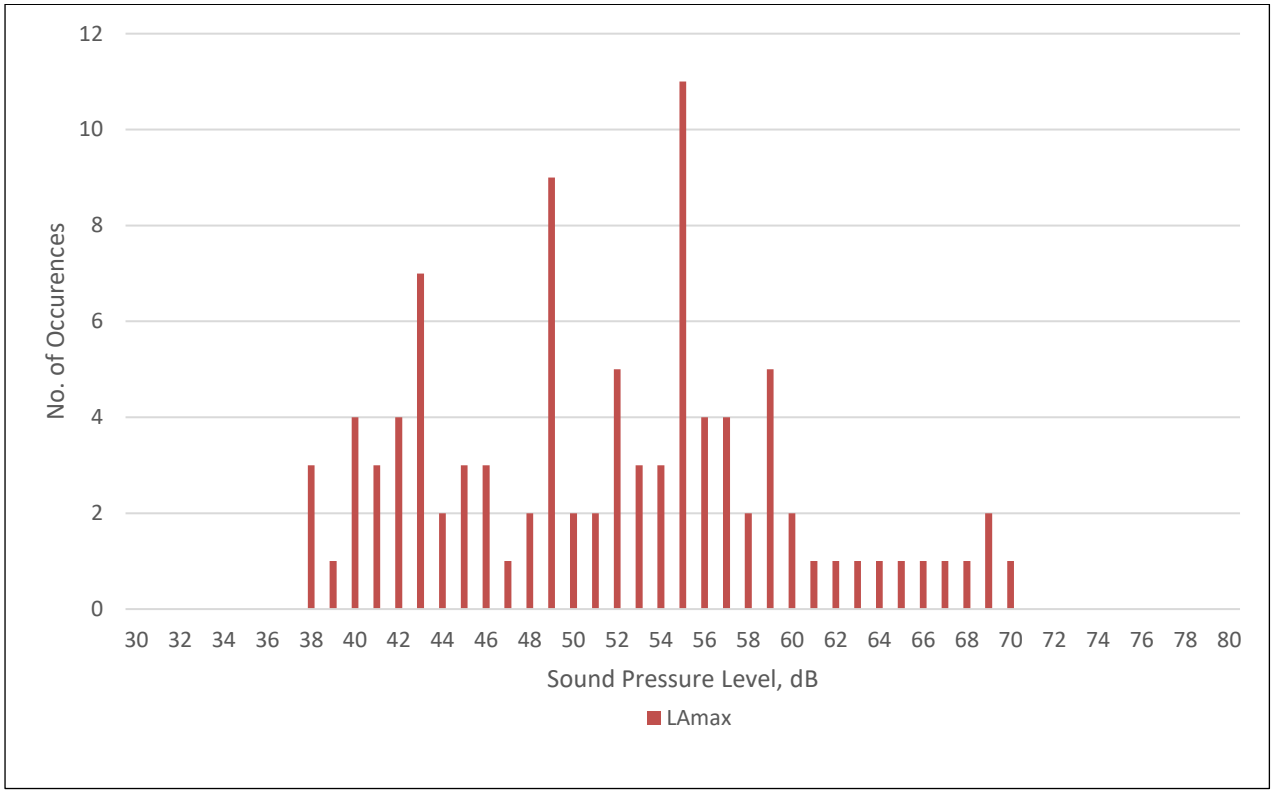
Date	Sound Pressure Level (dB re. $2x10^{-5}$ Pa)

	Daytime (07:00 – 19:00 hrs)		Night-time (23:00 – 07:00 hrs)	
	L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}
2nd March 2026	52	45	45	37
3rd March 2026	53	47	-	-
Average	**53**	**46**	**45**	**37**

During installation and collection of the noise monitor at location UN01 the dominant noise source audible was distant road traffic noise from The Old Fort Road. Other audible noise sources included birdsong, and leaves blowing lightly in the wind. The wate water treatment plant to the north was not audible.

The L_{AFmax} values were measured at 5 minute intervals over the duration of the unattended monitoring survey. Figure 3-3 presents the distribution of the magnitude of L_{AFmax} events during the night period at location UN01.

Figure 3-3 Number of LAFmax events at each decibel level measured during the night period at location UN01



3.2.3.2 Location UN02

Table 3-9 presents the measured daytime and night-time noise levels at location UN02

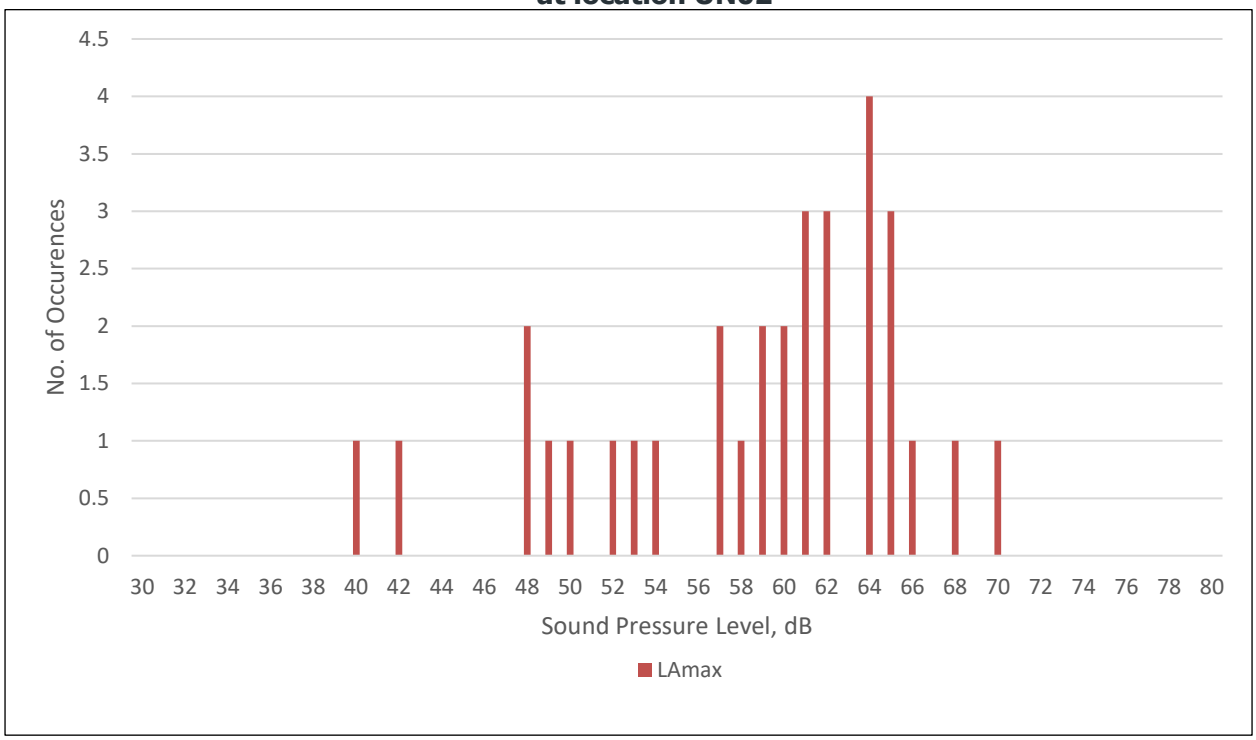
Table 3-9 Summary of Noise Results at Location UN02

Date	Sound Pressure Level (dB re. $2x10^{-5}$ Pa)			
	Daytime (07:00 – 19:00 hrs)		Night-time (23:00 – 07:00 hrs)	
	L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}
2nd March 2026	56	46	47	36
3rd March 2026	56	47	-	-
Average	**56**	**47**	**47**	**36**

During installation and collection of the noise monitor at location UN02 the dominant noise source audible was road traffic noise from The Old Fort Road. Other audible noise sources included birdsong, and distant construction noise to the east.

The L_{AFmax} values were measured at 5 minute intervals over the duration of the unattended monitoring survey. Figure 3-4 presents the distribution of the magnitude of L_{AFmax} events during the night period at location UN02.

Figure 3-4 Number of LAFmax events at each decibel level measured during the night period at location UN02



The L_{AFmax} values at either unattended noise monitoring location did not exceed 80 dB more than 20 times in a night.

3.3 Noise Risk Assessment Conclusion

With reference to the Noise Risk Assessment outlined in ProPG the noise levels for relevant periods have been derived in order to classify the proposed development site. Table 3-10 summarises the predicted noise levels at the most exposed proposed building facades, as per the proposed site layout. UN01 represents the northern facing facades and UN02 represents the southern facing facades.

Table 3-10 Categorising Proposed Site

Location Ref	Period	Measured Noise Level (dB, $L_{Aeq,T}$)	"Risk Category"
UN01	Daytime (07:00 – 23:00hrs)	53	Low
	Night-time (23:00 to 07:00hrs)	45	Low
UN02	Daytime (07:00 – 23:00hrs)	56	Low
	Night-time (23:00 to 07:00hrs)	47	Low
USL1	Daytime (07:00 – 23:00hrs)	51	Low
	Night-time (23:00 to 07:00hrs)	43	Low

Giving consideration to the baseline noise levels presented in the previous sections the initial site noise risk assessment has concluded that the level of risk on the site can be classified as a 'Low' noise risk.

Additionally, the Stage 1 Noise Risk Assessment requires analyses of the L_{AFmax} noise levels. The analysis indicates that the L_{AFmax} noise levels are expected to be lower than 80 dB more than 20 times per night, and therefore does not exceed the threshold whereby ProPG recommends that the site is considered as high risk, with respect to this aspect.

ProPG states the following with respect to low risks:

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.*

Given the above it can be concluded that the development site may be categorised as *Low Risk* and as such an Acoustic Design Strategy will be required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development.

It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used:

"2.12 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. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as low risk."

Therefore, following the guidance contained in ProPG does not preclude residential development on sites that are identified as having '*Low*' noise risk. It merely identifies the fact that a more considered approach will be required to ensure the developments on the higher risk sites are suitable designed to mitigate the noise levels. The primary goal of the approach outlined in ProPG is to ensure that the best possible acoustic outcome is achieved for a particular site.

4. STAGE 2 – FULL ACOUSTIC ASSESSMENT

4.1 Element 1 – Good Acoustic Design (GAD) Process

4.1.1 ProPG Guidance

In practice, good acoustic design should deliver the optimum acoustic design for a particular site without adversely affecting residential amenity or the quality of life of occupants or compromising other sustainable design objectives. It is important to note that ProPG specifically states that good acoustic design is not equivalent to overdesign or "*gold plating*" of all new development but that it seeks to deliver the optimum acoustic environment for a given site.

Section 2.23 of the ProPG outlines the following checklist for Good Acoustic Design:

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

In the context of the proposed development, each of the considerations listed above have been addressed in the following subsections.

4.1.2 Application of GAD Process to Proposed Application

Relocation or Reduction of Noise from Source

The surrounding road network and wastewater treatment plant is located outside the redline boundary of the site and therefore it is beyond the scope of this development to introduce any noise mitigation at source.

Planning, Layout and Orientation

In the first instance, consideration would be that the buildings are set back from the road. As such, the buildings on the site have been positioned with a set back from road. Buildings in the proposed development themselves will provide screening for amenity areas and other buildings at greater set back distances from road.

Select Construction Types for meeting Building Regulations

Masonry constructions will be used in constructing the external walls of the development. The masonry construction type offers high levels of sound insulation performance. However, as is typically the case the glazed elements and any required ventilation paths to achieve compliance with Part F of the Building Regulations will be the weakest elements in the façade in terms of sound insulation performance.

Consideration will therefore be given to the provision of upgraded glazing where required. For units where it will not be possible to achieve the desirable internal acoustic environments with windows open, the proposal here is to provide dwelling units with glazed elements that have good acoustic insulation properties so that when the windows are closed the noise levels internally are good. Inhabitants will be able to open the windows if they wish, however, doing so will increase the internal noise level.

This approach to mitigation is supported in ProPG where it states the following:

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

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

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

It is important to note that it is impractical to achieve the good internal noise levels with windows open across the vast majority of development sites in urban or suburban locations. Such sites would need to be classified as having a negligible risk in accordance with the ProPG noise risk assessment approach. For this reason, there are no guidance documents either at a local level or an international level that AWN is aware of which would support the approach of achieving the ideal internal noise levels only in the open window scenario. It is therefore considered entirely correct and justifiable to provide building facades with a moderate degree of sound insulation such that with windows closed a good internal acoustic environment is achieved.

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

The good acoustic design measures that have been implemented on site, e.g. locating properties away from the road, placing outdoor space on the quiet side of buildings, are considered to be cost neutral and do not have any significant impact on other issues.

Assess External Amenity Area Noise

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

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

External noise levels across the site during the daytime survey periods, are predicted to be in the below 55 dB $L_{Aeq,16hr}$

Summary

Considering the constraints of the site, in so far as possible and without limiting the extent of the development area, the principles of Good Acoustic Design have been applied to the development.

In terms of viable alternatives to acoustic treatment of façade elements, currently it is not considered likely that there will be further options for mitigation outside of proprietary acoustic glazing and ventilation.

4.2 Element 2 – Internal Noise Levels

Internal Noise Criteria

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 2-1 and are based on annual average data. Table 2-1 has been repeated here for reader convenience.

Table 2-1 Indoor Ambient Noise Levels for Dwellings from BS8233:2014

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

In addition to these absolute internal noise levels, ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external WHO guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

Façade Noise Levels

Predicted and measured noise levels have been used to derive an assessment noise level at the northern and southern façades of the proposed development. These façades represent the worst-case noise level scenarios for the proposed site.

Northern Façade

Proprietary noise calculation software was used for the purposes of establishing the prevailing noise levels on the proposed site. The selected software, dGmR iNoise 2024.1, calculates noise levels in accordance with the *ISO 9613: Acoustics – Attenuation of sound during propagation outdoors*.

In the absence of supplied specific sound power data for the WWTP, the baseline sound pressure measurement data, including frequency analysis, has been extrapolated to estimate the cumulative sound power data for the plant operating at the WWTP.

Table 4-1 summarises the assumed WWTP sound power values inputted into the model.

Table 4-1 Assumed Sound Power Values for WWTP

L_w(dB(A))	Sound Power Level (dB(A)) per Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
86	84	75	75	74	75	70	66	63

The following information was included in the model:

- Site layout drawings of the proposed development;
- OS mapping of the surrounding environment, and
- 3D topographical survey data for the development and adjacent road.

Table 4-2 presents the noise levels predicted to be incident on the various northern facades in Block A, B and C during the day and night time periods respectively.

Table 4-2 Summary of Predicted Northern Facade Noise Levels

Ref	Period	$L_{Aeq,T}$ dB					
		Ground Floor	1st Floor	2nd Floor	3rd Floor	4th Floor	5th Floor
A	Day $L_{Aeq,16hr}$	45	45	45	45	45	-
	Night $L_{Aeq,8hr}$	45	45	45	45	45	-
B	Day $L_{Aeq,16hr}$	43	43	43	42	42	42
	Night $L_{Aeq,8hr}$	43	43	43	42	42	42
C	Day $L_{Aeq,16hr}$	39	39	39	39	39	39
	Night $L_{Aeq,8hr}$	39	39	39	39	39	39

Southern Façade

The measured noise level at UN02 which is representative of the southern façade, which is most affected by road traffic, has been used to determine the assessment noise level for the southern façades of the proposed developments

Table 4-3 Summary of Measured Southern Facade Noise Levels

Ref	Period	Measured Noise Levels (dB)
UN02	Day $L_{Aeq,16hr}$	56
	Night $L_{Aeq,8hr}$	47

Discussion on Open/Closed Windows

The level of sound reduction offered by a partially open window stated in ProPG is typically applied as 10 to 15 dB.

Considering the design goals outlined in Table 2-1 and sound reduction across an open window of 15 dB, the free-field noise levels that would be required to ensure that internal noise levels do not exceed 'good' or 'reasonable' internal noise levels have been summarised in Table 4-4.

Table 4-4 External Noise Levels Required to Achieve Internal Noise Levels

Level Desired	Day 07:00 to 23:00hrs	Night 23:00 to 07:00hrs
Good (i.e. at or below the internal noise levels)	50 – 55 dB $L_{Aeq,16hr}$	45 dB $L_{Aeq,8hr}$
Reasonable (i.e. 5 dB above the internal noise levels)	55 – 60 dB $L_{Aeq,16hr}$	50 dB $L_{Aeq,8hr}$

Recommended Façade Treatment

Northern Façade

As presented in Table 4-2 above, all proposed northern façades noise levels are predicted to be within the good level daytime adopted criterion of 50dB $L_{Aeq,T}$ and night-time criterion of 45dB $L_{Aeq,T}$. Therefore, no mitigation beyond standard double glazing is required for the northern facades of the development.

Southern Façade

The external noise levels at the most exposed southern facades have been categorised as low noise risk in accordance with ProPG 2017. The assessment has determined that when windows are closed and with the standard ventilation strategy for the building, a good internal noise level in accordance with BS 8233:2014, is achieved within all bedrooms at night. The assessment has confirmed that no specific acoustic glazing is required to achieve this scenario over and above standard double glazing. When windows are open, a reduction in façade sound insulation will occur, however, even under this more conservative scenario, the predicted internal ambient noise levels fall within the good to reasonable BS 8233:2014 guideline ranges.

Wall Construction

In general, all wall constructions (i.e. block work or concrete) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal. The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 50 dB R_w for this construction.

Ventilation

The ventilation strategy for the development will be in accordance with Part F of the Building Regulations and will be finalised at the detail design stage. Where possible the ventilation openings should be placed on the elevation of the building facing away from the road.

Internal Noise Levels

Taking into account the external façade levels and the specified acoustic performance to the building envelope, the internal noise levels have been calculated. All locations are predicted to achieve good internal noise levels with windows closed.

4.3 Element 3 – External Amenity Areas

As previously discussed, due to set back distances from the road and screening provided by development buildings themselves, external amenity areas are expected to achieve the recommended <55 dB $L_{Aeq,16hr}$ noise level recommended in ProPG.

4.4 Element 4 – Assessment of Other Relevant Issues

Element 4 gives consideration to other factors that *may* prove pertinent to the assessment, these are defined in the document as:

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

Each is discussed in turn below.

4.4.1 Compliance with Relevant National and Local Policy

There are no national policy documents relating to the acoustic design of residential dwellings.

The Cork County Council Noise Action Plan 2024-2028 recommends that the guidance contained within ProPG should be used in assessing the noise impact on new residential developments being introduced to existing noise sources.

This Acoustic Design Statement has been prepared in compliance with the requirements of ProPG and therefore complies with the requirements of local policy.

4.4.2 Magnitude and Extent of Compliance with ProPG

As discussed within this report the following conclusions have been drawn with regards to the extent of compliance with ProPG:

- All dwellings as part of the development have been designed to achieve the good level of internal noise levels specified within ProPG with windows closed.
- External amenity areas have been assessed and are predicted achieve the recommended noise levels outlined in ProPG.

4.4.3 Likely Occupants of the Development

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

4.4.4 Acoustic Design v Unintended Adverse Consequences

Design aspects such as roadside barriers that remove views or prevent crossing roads, sealed facades that affect personal control over the internal environment etc., have been avoided through implementation of Good Acoustic Design principles. Unintended adverse consequences do not occur on this project due to the acoustic mitigation specified.

4.4.5 Acoustic Design v Wider Planning Objectives

This assessment has demonstrated the noise insulation measures required to ensure that the proposed dwelling units achieve a good internal noise environment. It is also assumed that wider planning objectives have been adhered to during the process of developing the design for the subject development.

5. CONSTRUCTION NOISE ASSESSMENT

5.1 Predicted Impacts of the Proposed Development

A variety of items of plant will be in use for the purpose of site clearance and construction works. There will also be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for the generation of elevated levels of noise in the vicinity of existing noise sensitive properties.

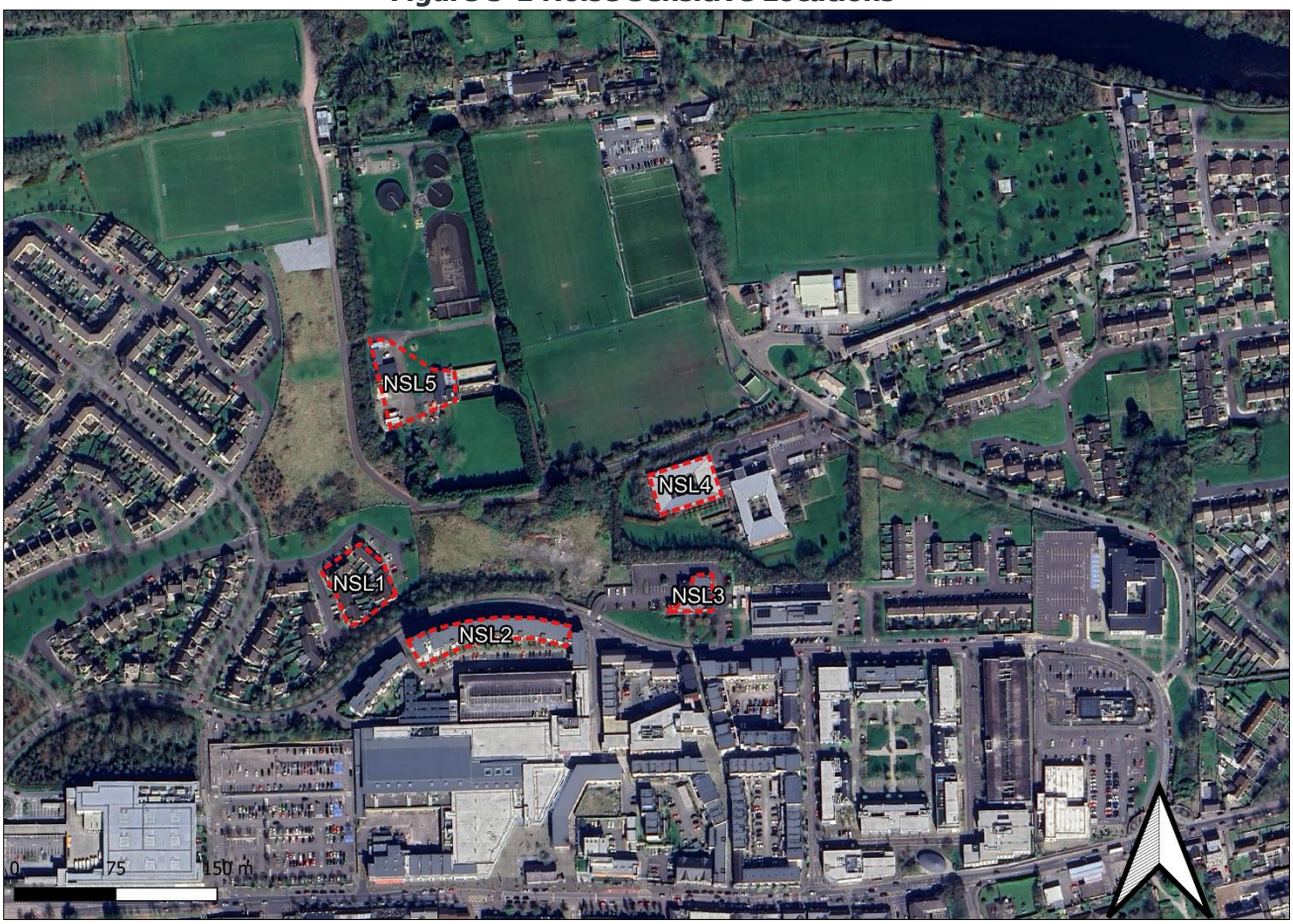
The proposed general construction hours are 07:00 to 18:00 hrs, Monday to Friday and 08:00 to 14:00 hrs on Saturdays. No working will be allowed on Sundays and Public Holidays. Subject to the agreement of the local authority, out of hours working may be required for watermain connections, foul drainage connections etc.

The construction phase will be controlled using construction noise threshold values which the contractor will be required to work within as much as is practicable. In this regard, the choice of plant, scheduling of works on site, provision of localised screening and other best practice control measures will be employed.

5.1.1 Sensitive Receptors

Noise and vibration impacts have been assessed to the nearest sensitive locations to the site boundaries, i.e. a worst-case assessment of the closest sensitive locations during any of the construction stages. These closest locations are identified in Figure 5-1 and described below.

Figure 5-1 Noise Sensitive Locations



- NSL1: The Waltham Abbey residential housing estate, approximately 25m from the site boundary and approximately 40m from the closet structural works associated with the construction of the residential units.

- NSL2: The Crescent residential units, approximately 20m from the site boundary and approximately 40m from the closest structural works associated with the construction of the residential units.

- NSL3: The Ballincollig Medical Centre, approximately 50m from the site boundary and approximately 70m from the closet structural works associated with the construction of the residential units.

- NSL4: The Ballincollig Community Nursing Unit, approximately 40m from the site boundary and approximately 60m from the closet structural works associated with the construction of the residential units.

- NSL5: The Ballincollig Waste Water Treatment Plant, approximately 75m from the site boundary and approximately 80m from the closet structural works associated with the construction of the residential units.

The construction stage will be undertaken over a number of sub-phases from site preparation through to building construction and internal fit out. In terms of the potential noise and vibration impacts, the key stages and activities are expected to involve:

- Site Set Up;
- Ground Works;
- General Construction.

The construction programme will create typical construction activity related noise onsite. Indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in British Standard Institute (BSI) BS 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (BSI, 2014). This standard sets out sound power/sound pressure levels for plant items normally encountered on construction sites, which in turn enables the prediction of noise levels.

The following section discusses typical noise levels associated with the Proposed Development construction phase and comments on potential noise impacts at distances to the nearest Noise Sensitive Locations (NSLs) during the key stages and types of activities that will occur on site.

5.1.1.1 Site Set Up and Clearance

For site set up and clearance the works will involve the removal of any vegetation within the site as well as establishing a site office and compound. The provision of temporary foul and storm sewers will also be provided for the site office during this phase. This will likely be the most noise intrusive works during this phase of construction. Reference to BS 5288-1 indicates that highest noise levels during this phase will be associated with ground clearance activities. Noise levels from these activity types are typically in the range of 80 to 90 dB L_{Aeq} at 10m.

For construction activities associated with surface ground clearance, a total construction noise level of 92 dB L_{Aeq} at 10m has been used for the purposes of indicative calculations. This would involve for example, one item of plant at 90 dB L_{Aeq} and two items of plant at 85 dB L_{Aeq} and one item of plant at 80 dB L_{Aeq} operating simultaneously within one work area which is considered a worst-case scenario.

5.1.1.2 Ground Works

For construction works associated with activities such as excavation and structural works including excavators, loaders, dozers, cranes, generators and concreting works etc. noise levels are typically in the range of 70 to 82 dB L_{Aeq} at 10m. This would include, for example, one item of plant at 78 dB L_{Aeq}, two items of plant at 76 dB L_{Aeq} and one item of plant at 70 dB L_{Aeq} operating simultaneously within a work area resulting in a total noise level of 78 dB L_{Aeq} along the closest works boundary.

5.1.1.3 General Construction

Once the ground preparation and foundation works have been completed, a large portion of the work will involve manual labour and cranes with lower overall noise levels. For the purpose of this assessment a combined sound pressure level of 78 dB $L_{Aeq,T}$ at 10m has been used for construction noise calculations during ongoing site works and compounds once site clearance and excavation works are completed. This would include, for example, one item of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area resulting in a total noise level of 78 dB L_{Aeq} along the closest works boundary.

Given the nature of the proposed works which will include standard building techniques across the site, the cumulative construction noise levels above represent conservative noise levels used to assess construction activities associated with the various stages of construction. This worst-case scenario is a robust assumption made for developments of this size, on the basis that it is unlikely that more than 5 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other at all times. In reality, items of construction plant and machinery will be operating at varying distances from any one NSL.

5.1.1.4 Indicative Construction Noise Levels

Indicative noise calculations have been undertaken which assume that plant items are operating for 66% of the time. Screening from a standard site hoarding of 2.4m is assumed around all site boundaries. It must be stated that for most of the time, plant and equipment will be a greater distance from the nearest NSLs than those used within the calculations and the "on-time" of plant and equipment will be less than those assumed over a normal working day (i.e. the use of excavators will be in use for shorter periods than those assumed over a normal working day) and consequently will have lower noise levels. The assessment presented is therefore representative of a best estimate conservative scenario representing construction activities. Table 5-1 presents the calculated noise levels at varying distances.

Table 5-1 Construction Noise Levels at Varying Distances

Construction Phase	Total Sound Pressure, dB $L_{Aeq,T}$ at 10m	Calculated Noise Levels at Varying Distances, dB $L_{Aeq,T}$							
		20 m	30 m	40 m	50 m	60 m	70 m	80 m	100 m
Site Set Up and Clearance	92	79	75	73	71	69	68	67	64
Ground Works	82	69	65	63	61	59	58	57	54
General Construction	78	65	61	59	57	55	54	53	50

5.1.1.5 Site Set Up Noise

During site set up and clearance works, there is potential for the CNT to be exceeded at distances of approximately 90 m or less, particularly where activities occur along the immediate site boundaries. When

construction activities take place at distances greater than 90 m from NSLs, noise levels are expected to remain within the CNT.

All identified NSL's are within a distance of 90m to construction activities, as a result, exceedances of the CNT are likely at these locations. NSLs 3, 4 and 5 may experience temporary, negative, moderate to significant impacts. NSLs 1 and 2 may experience temporary, negative, significant to very significant impacts.

Overall, this phase of construction has the potential to result in temporary, negative impacts ranging from moderate to very significant.

However, it should be noted that, if the durations associated with these significance thresholds are not exceeded, as expected, the resulting effects during this phase of the works would be considered not significant. The Construction Environmental Management Plan (CEMP) prepared for the development indicates that pneumatic rock breaking will be required for approximately 48 hours over the course of the construction programme. This is below the duration thresholds for significant impact set out in Section 2.4.

5.1.1.6 Ground Works

At all NSLs the ground-works activities associated with the building construction are located at distances greater than 30 m from the works. As a result, the lower CNT threshold is not expected to be exceeded at the NSLs, leading to a temporary, negative, slight to moderate impact at all NSLs.

5.1.1.7 General Construction

At all NSLs the general construction activities associated with the buildings construction are located at distances greater than 20 m from the works. As a result, the lower CNT threshold is not expected to be exceeded at the NSLs, leading to a temporary, negative, slight to moderate impact at all NSLs.

5.1.1.8 Construction Phase Impacts Summary

Noise mitigation measures will therefore be required on site to reduce construction noise levels along the boundaries to reduce any potential significant effects. Recommended mitigation measures are presented in Section 5.2.

5.1.1.9 Construction Vibration

During rock breaking, there is potential for vibration to be generated through the ground. Empirical data for this activity is not provided in the BS 5228-2:2009+A1:2014 (BSI 2014b) standard, however the likely level of vibration from this activity is expected to be significantly below the vibration criteria for building damage on experience from other sites. AWN Consulting Ltd have previously conducted vibration measurements under controlled conditions, during trial construction works, where breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator; and
- 6 tonne hydraulic breaker on large Liebherr tracked excavator.

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 PPV (mm/s) to 0.25 PPV (mm/s) at distances of 10m to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.4 PPV (mm/s) to 0.24 PPV (mm/s) at distances of 10m to 50m respectively.

Whilst these measurements relate to a breaking of concrete, the range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity. The vibration levels experienced at surrounding receptors will be well below the criteria of cosmetic building damage, however, it will likely be perceptible when work is taking place at the closest locations to the receptors. Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in Table 2-5.

In this instance, taking account of the distance to the nearest sensitive off-site buildings, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 2-5 and therefore will avoid any cosmetic damage to buildings. Vibration levels are also expected to be below a level that would cause disturbance to building occupants, as set out in Table 2-6. The predicted vibration impact during the construction phase is negative, not significant and short-term.

5.1.1.10 Construction Traffic

During the construction phase, traffic associated with the Proposed Development would consist of a mix of Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) travelling to and from the site.

It is noted that in order to increase traffic noise levels by 1 dB, traffic volumes would need to increase by the order of 25%. It is forecast that additional traffic introduced onto the local road network due to the construction stage of the development will not introduce a level of traffic that would result in a volume change in excess of 25% on the surrounding road network and the expected impact is therefore negative, not significant and short-term.

5.2 Mitigation Measures

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet plant;
- Noise control at source;
- Screening, and;
- Liaison with the public.

Further comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring, and also by referring to the preliminary Construction Environmental Management Plan (CEMP).

5.2.1 Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item will be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action will be to identify whether said item can be replaced with a quieter alternative.

5.2.2 Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control at source. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover

plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

The following best practice migration measures will be considered:

- The use lifting bulky items, dropping and loading of materials within these areas will be restricted to normal working hours.
- For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over normal operation. Mobile plant will be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system.
- For percussive tools such as pneumatic breakers, a number of noise control measures include fitting muffler or sound reducing equipment to the breaker tool and ensuring any leaks in the air lines are sealed.
- Erecting localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling, ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

5.2.3 Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Standard construction site hoarding (2.4 m in height) with a mass per unit of surface area greater than 7 kg/m^2 can provide adequate sound insulation.

5.2.4 Liaison with the Public

A designated Project Supervisor Construction Stage (PSCS) will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the PSCS. In addition, prior to particularly noisy construction activity (e.g. piling), the PSCS will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

5.3 Residual Impacts

5.3.1 Construction Noise

The use of best practice noise control measures, hours of operation, scheduling of works within appropriate time periods, and noise monitoring during this phase will be implemented. With the inclusion of the various noise and vibration control measures on site discussed in Section 5.2, it is expected that calculated noise levels in Table 5-1 can be reduced by 5 dB. Table 5-2 presents the noise levels at varying distances post mitigation.

Table 5-2 Construction Noise Levels at Varying Distances Post Mitigation Measures

Construction Phase	Total Sound Pressure, dB $L_{Aeq,T}$ at 10m	Calculated Noise Levels at Varying Distances, dB $L_{Aeq,T}$							
		20 m	30 m	40 m	50 m	60 m	70 m	80 m	100 m
Site Set Up and Clearance	92	74	70	68	66	64	63	62	60
Ground Works	82	64	60	58	56	54	53	52	50
General Construction	78	60	56	54	52	50	49	48	46

For early-stage site set up and clearance works, there is potential for construction noise levels to remain above the CNT at NSL 1 and 2 by 3 dB during specific phases of work, when the works are carried out at the closet site location to the NSLs. Additionally, the works are expected to be completed within the temporal criteria outlined in Section 2.4 and, hence, an overall negative, temporary and slight to moderate impact associated with these works.

During all other construction phases, noise levels can be controlled to within the CNTs at all NSLs thus resulting in a negative, short term, slight to moderate impact.

5.3.2 Construction Phase Traffic Noise

The residual noise impact will be negative, short term and not significant impact for this phase.

5.3.3 Construction Phase Vibration

Vibration impacts during the construction phase will be negative, short term and not significant.

6. CONCLUSION

AWN Consulting has been commissioned to carry out a study in relation to the potential inward noise and construction noise impacts on the proposed residential development site at Old Fort Road, Ballincollig, Co. Cork and the external noise within the developments amenity spaces.

Baseline noise surveys from 2019 and 2026 and predictive noise modelling has been used to determine the existing noise environment at the site. An inward noise assessment has been undertaken based on the results of the noise survey and predictive model as recommended in the ProPG: Planning & Noise guidance document.

The measured and predicted noise levels on the site have been used to calculate noise levels at specific facades of proposed residential properties and to predict the internal noise levels within the living room and bedroom spaces, taking account of the proposed building envelope and conditions in the receiving rooms (e.g. volumes and room acoustic characteristics). The calculated noise levels place the proposed development within the low risk category of ProPG. The use of standard double glazing on the buildings facades and standard ventilation systems confirm the predicted noise levels conform to the criteria taken from BS8233:2014 for good internal noise levels.

It is predicted that the amenity spaces will experience noise levels below the recommended noise level of ≤55 dB $L_{Aeq,16hr}$.

The construction noise assessment demonstrates that, while certain construction activities have the potential to generate temporary and locally significant impacts, these effects can be effectively controlled through the implementation of established best practice mitigation measures. With these measures in place, all construction-phase noise and vibration impacts are predicted to be temporary, negative, and not significant.

APPENDIX A. GLOSSARY OF ACOUSTIC TERMINOLOGY

Ambient noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
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 per cent of a given time interval, T ($L_{AF90,T}$).
dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 μPa).
dB(A)	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$D_{n,e,w}$	Weighted element-normalized level difference. This is the value of sound insulation performance of a ventilator measured under laboratory conditions. It is a weighted single figure index that is derived from values of sound insulation across a defined frequency spectrum. Technical literature for acoustic ventilators typically presents sound insulation data in terms of the $D_{n,e,w}$ parameter.
Hertz (Hz)	The unit of sound frequency in cycles per second.
$L_{Aeq,T}$	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T).The closer the L_{Aeq} value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.
L_{AFN}	The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.
L_{AF90}	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the "Fast" time weighting.
L_{AF10}	Refers to those A-weighted noise levels in the upper 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period. It is typically representative of traffic noise levels. Measured using the "Fast" time weighting.
L_{AFmax}	is the instantaneous fast time weighted maximum sound level measured during the sample period.

L_{den}	The L_{den} (Day Evening Night Sound Level) is the average sound level over a 24 hour period, with a penalty of 5 dB added for the evening hours or 19:00 to 22:00, and a penalty of 10 dB added for the night-time hours of 22:00 to 07:00.
Octave band	A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.