Table of Contents

Table of Figures

Table of Tables

11 Noise and Vibration

11.1 Introduction

Irwin Carr Consulting has been instructed by Platinum Land to undertake a detailed noise impact assessment in relation to a proposed mixed-use development at the Chivers site, Coolock, Dublin.

The site is bounded by Coolock Drive to the West and Greencastle Road to the North, with the existing Cadbury's site to the east with a number of retail units to the south and the east.

FIGURE 11.1 SITE LOCATION

The proposed development is dominated by traffic noise from the surrounding road network. The impact of transportation noise on proposed residential developments are typically assessed with reference to absolute noise levels. ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development – May 2017 provides a methodology for assessing external noise impacts on proposed residential development from transportation dominant noise environments.

This chapter of the Environmental Impact Assessment Report (EIAR) considers the existing baseline noise levels in the vicinity of the site, predicted construction (including demolition) and operational noise levels and the impact of the predicted change in noise levels. Noise and vibration mitigation measures are proposed as required.

The Code of practice for noise and vibration control on construction and open sites (BS 5228-1:2009) provides a number of methodologies for assessing the significance of construction noise at residential receptors.

Irwin Carr Consulting is an indigenous company based in Ireland. The company has a proven track record in noise impact assessments throughout the UK and Ireland, with extensive knowledge of the issues in relation to noise impacting upon residential developments.

This chapter was prepared by Dr Chris Jordan. Chris is a Director in Irwin Carr Consulting with primary responsibilities for assessing environmental noise and air quality. He has more than 15 years' experience of working in acoustics, having previously worked in both the public and private sectors after obtaining a BSc (Hons) Degree in Environmental Health – 1st Class, a Post-Graduate Diploma in Acoustics and completed his Doctorate in the field of Acoustics. Chris has been responsible for undertaking and reviewing noise impact assessments on numerous large scale residential developments throughout Ireland.

11.2 Proposed Development

The proposal consists of the demolition of existing buildings and redeveloping it for 495 Build to Rent residential units, which are proposed to be split into 4 no. proposed blocks (Blocks A1, A2 each with two 10 storey elements, and Blocks B & C ranging from 3no. to 7no. storeys and associated residential services and facilities, as well as courtyard spaces. In addition, the scheme includes for a service building comprising of a crèche (300 sq. m), café (34 sq. m) and gym (412 sq. m), as well as streets, public realm amenity and green open space.

FIGURE 11.2 PROPOSED SITE LAYOUT

11.3 Methodology

Ireland does not have any statutory noise limit values. However, in the current *Dublin Agglomeration Environmental Noise Action Plan December 2013 – November 2018,* it is indicated that it is

undesirable to have areas with a night time level greater than 55 dB and a daytime level greater than 70 dB. The Plan identifies areas with desirable low sound levels as those area with a with night time level less than 50 dB and\or a daytime level less than 55dB.

These criteria are similar to the World Health Organisation (WHO) criteria which states:

"To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise."

11.3.1 Noise Assessment Criteria

Dublin City Council as part of the requirements of the EU Directive on the Management of Environmental Noise and under the Environmental Noise Regulations S.I. No. 140 of 2006, has revised and upgraded their traffic source "Noise Maps" for the 2012 base year. These maps are to be used to assess the number of people annoyed and sleep-disturbed respectively throughout Dublin.

The maps are Strategic Noise Maps, and should be used for strategic, high level planning and not for the assessment of local noise nuisances.

Dublin City Development Plan 2016-2022 (DCDP)

Section 16.36 of Dublin City Development Plan 2016-2022 states that:

> *"Dublin City Council will have regard to the Dublin Agglomeration Noise Action Plan 2013-2018 when assessing planning applications"*

The Dublin Agglomeration Noise Action Plan 2013-2018 (DANAP) was produced by four Local Authorities to avoid, prevent and reduce the harmful effects of noise from road traffic, rail and aircraft. It has been used in this instance to determine the impact of noise from these sources in the vicinity of the application site.

There are a number of commercial/industrial sources in the vicinity of the site, but the main noise source is from traffic on the surrounding road network.

The document contains absolute noise thresholds for desirable low and undesirable high sound levels. These threshold levels are presented in **Table 11-1**.

Category	Daytime (0700-2300) LAeq, 16 hr (dB)	Night-time (2300-0700) LAeq, 8 hr (dB)
Desirable Low Sound Levels	<55	<50
Undesirable High Sound Levels	<70	<55
Quiet Area	<55	<45

TABLE 11.1 DUBLIN AGGLOMERATION NOISE ACTION PLAN 2013-2018 THRESHOLDS

11.3.1.1 Construction and Demolition Phase

The Code of practice for noise and vibration control on construction and open sites (BS 5228-1:2009) provides a number of methodologies for assessing the significance of construction noise at residential receptors.

Transport Infrastructure Ireland`s (TII) document *Good Practice Guidance for the Treatment of Noise during the planning of National Road Schemes* (TII, 2014) contains information on the permissible noise and vibration levels during the construction phase of a project.

TII considers that the noise levels as outlined in **Table 11.2** are typically deemed acceptable. It should be noted that these values are indicative only and it may be appropriate to apply more stringent limits in areas where pre-existing noise levels are low.

Days & Times	$L_{Aeq\ (1hr)}$ dB	$L_{pA(Max)slow}$ dB
Monday to Friday (07:00 – 19:00hrs)	70	80
Monday to Friday (19:00 – 22:00hrs)	60	65
Saturdays (08:00 – 16:30hrs)	65	75
Sundays and Bank Holidays (08:00 to 16:30hrs)	60	65

TABLE 11.2 MAX. PERMISSIBLE NOISE LEVELS AT FAÇADE OF NEARBY DWELLINGS DURING CONSTRUCTION

It should be noted that the noise criteria quoted in the Table above are specific to construction (including demolition) activities only (i.e. these levels are not cumulative with the existing noise environment from road traffic and other surrounding sources).

The main construction works will take place over approximately a 36-month period within which the majority of truck movements will occur. This covers the enabling works, demolition, excavation and construction phases.

Within this period there will be some activities such as excavation for the building which will produce the greatest number of HGV movements in and out of the site. This will only occur over a short period of time (3 months) within this 36-month period.

During this peak trip generation phase the key traffic flows per day are as follows:

- 2-way HGV movements per day: 84; and
- 2-way cars / site operative movements per day: 20.

The construction phase will generate 100 site operatives. It has been assumed that 25% of staff will access the site via public transport. The remainder will comprise of site operatives travelling to and from the site via car and van. It has been assumed that vehicle occupancy for the construction staff is typically 2 persons per vehicle.

During the construction phase the key traffic flows per day are as follows:

- 2-way HGV movements per day: 30; and
- 2-way cars / site operative movements per day: 76

The TII Guidelines recommend that in order to ensure that there is no potential for vibration damage during construction, vibration from construction activities should not exceed the values as set out in the TII guidance and detailed in **Table 11.3**.

Allowable vibration velocity (peak particle velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of;		
Less than 10Hz	10-50Hz	50 to 100Hz (and above)
8mm/s	12.5mm/s	20mm/s

TABLE 11.3 Maximum allowable vibration levels during construction phase

11.3.1.2 Operational Phase

In the absence of a specific Irish standard for assessing the impact of transportation noise on residential developments, it is usual to rely upon UK guidance as international standards. ProPG: *Planning & Noise (ProPG) Guidance* was recently published in its final format in May 2017 and

supersedes the withdrawn Planning Policy Guidance Note 24 – Noise - PPG24. It provides guidance for local authorities on the use of their planning powers to minimise the adverse impact of noise.

The impact of transportation noise on proposed residential developments are typically assessed with reference to absolute noise levels. ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development – May 2017 provides a methodology for assessing external noise impacts on proposed residential development from transportation dominant noise environments.

In particular, it aims to;

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development process;
- Encourage the process of good acoustic design in and around new residential development;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Improve understanding of how to determine the extent of potential noise impact and effect; and,
- Assist the delivery of sustainable development.

ProPG introduces an 'Initial Site Noise Risk Assessment' methodology which notes that with higher external noise levels the greater the risk of noise becoming a determining factor in the likelihood of permission being granted.

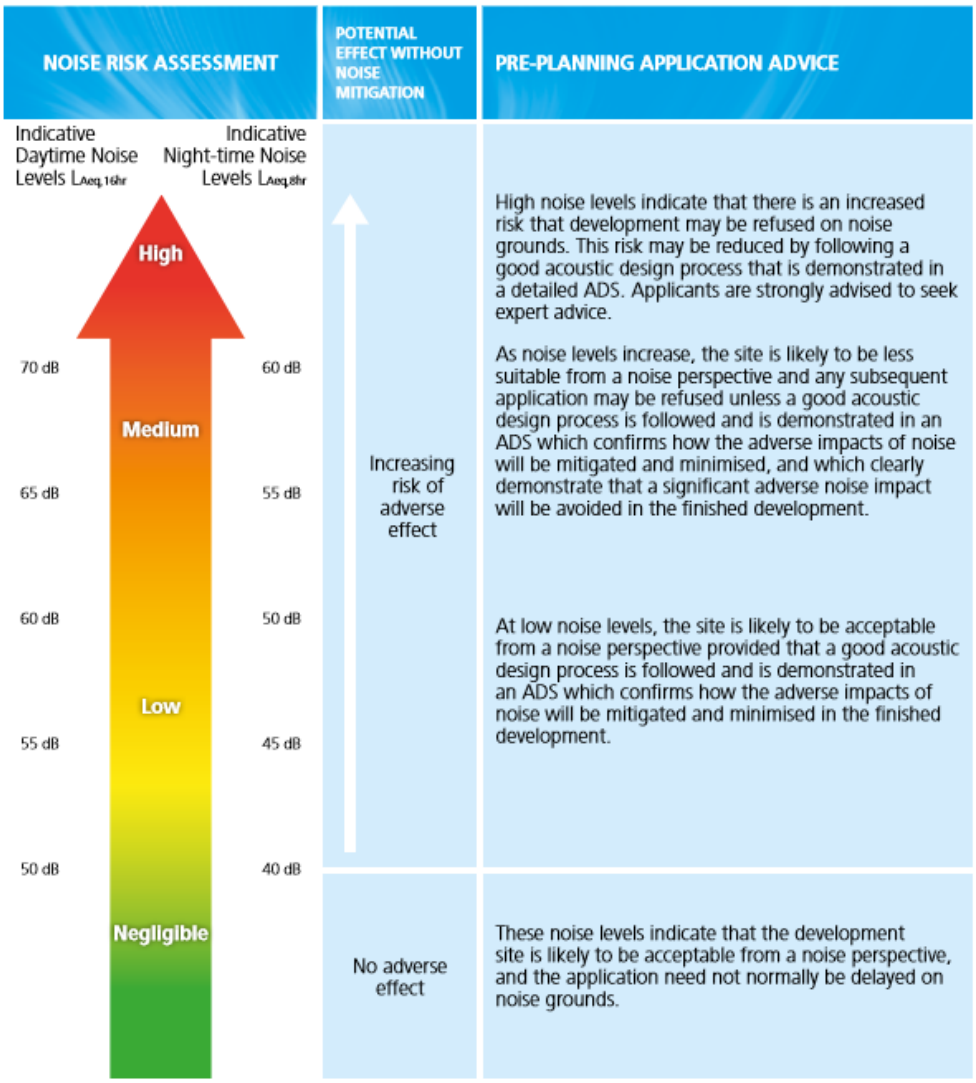

FIGURE 11.3 PROPG – INITIAL SITE NOISE RISK ASSESSMENT

ProPG advises that the noise risk assessment may be based on measurement or prediction (or a combination) as appropriate and should aim to describe noise levels during a typical worst case 24-hour day now or over the foreseeable future. The assessment should include the combined free-field noise level from all sources of transport noise that affect the site. In the case where industrial or commercial noise is present but not “dominant” (i.e. where the effect would be likely to be rated as lower than adverse if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk.

Where industrial/commercial noise is considered to be “dominant” then the ProPG approach should not be used for the industrial or commercial noise and regard should be had to the guidance in BS4142:2014.

Page 10 of the ProPG states;

"The judgement on whether or not to undertake a BS4142 assessment should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient."

In terms of this subject application, subjective observations on both leaving out and collecting the noise monitoring equipment (as well as a general understanding of the locality), was that the dominant noise source was traffic noise from the surrounding road network. No plant noise was audible at the noise monitoring location. Consequently, any contribution from existing industrial/commercial premises in proximity to the proposed development was included within the ProPG survey results.

11.4 Baseline Scenario

11.4.1 Environmental Noise Survey

The selection of the monitoring location was influenced by the following factors;

- Professional judgement, it is considered that the selected location is representative of the worst-case noise level in the vicinity of the subject site, being located towards the Malahide Road and close to the adjacent Cadburys site;
- Unattended monitoring requires a secure location to ensure that instrumentation cannot be tampered with as this may distort the readings with anomalous results;
- The selected location is remote from sources of extraneous noise (such as from children playing, gardening equipment etc.) and it is thus less likely that measurements would be contaminated.

Noise levels were measured within the proposed development site as described in **Table 11.4** and illustrated in **Figure 11.4**. The survey was undertaken between the 24th and 28th August 2017.

Noise Monitoring Location	OSI Grid Reference
Southern Edge	319798, 239677

TABLE 11.4 NOISE MONITORING LOCATION

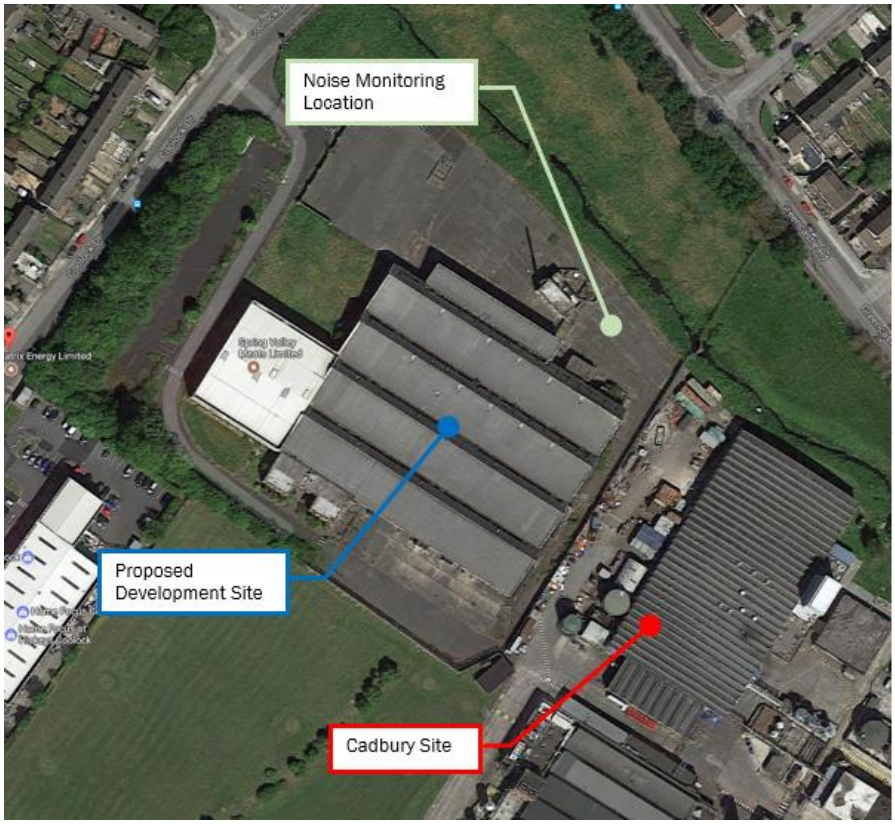

FIGURE 11.4 NOISE MONITORING LOCATION AND LOCATION OF NEAREST NOISE SENSITIVE RECEPTORS

The survey was set up by Shane Carr using the following equipment:

- 01dB DUO Precision Sound Level Meter (fitted with external all-weather kit)
- 01 dB CAL21 Acoustic Calibrator
- Davis Vantage Vue Weather Station

Instrumentation was calibrated before and after the survey period. Weather during the surveys was predominantly dry and calm with wind speeds less than 5 m/s. Any periods of rainfall or wind speeds in excess of 5m/s were excluded from the data pool.

The acoustic parameters measured included;

- L_{Aeq} – A-weighted equivalent continuous steady sound level during the sample period, effectively representing an average value; and
- L_{A90} – the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing.

Figure 11.5 presents the results of the noise measurements over the survey period.

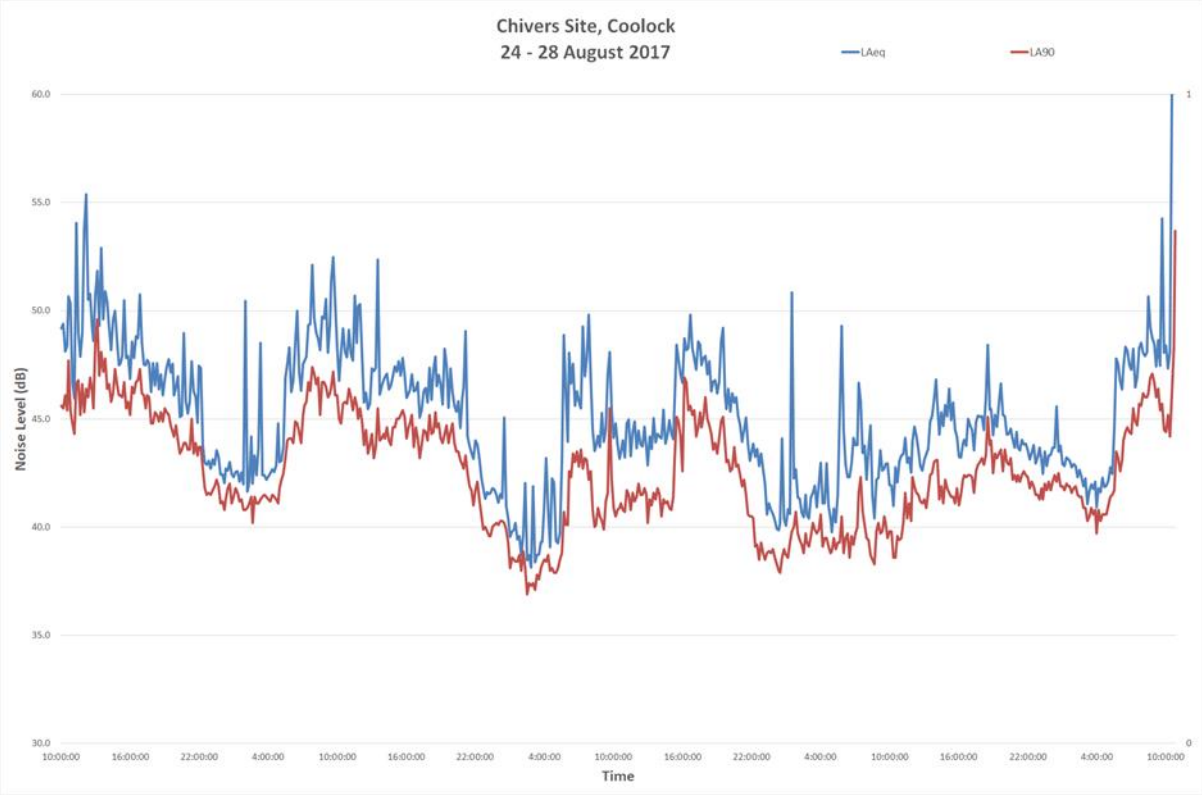

FIGURE 11.5 ACOUSTIC SURVEY TIME HISTORY

For the purposes of the noise impact assessment the measured daytime and night-time ambient sound levels are presented in **Table 11.5**.

Noise Level dB	
$L_{Aeq,16hr}$ Day	$L_{Aeq,8hr}$ **Night**
44	42

TABLE 11.5 Measured daytime and night-time ambient sound levels

*Denotes less than full 16hr measurement period due to equipment being set-up/collected on that day.

11.5 Difficulties Encountered

No difficulties were encountered during the preparation of this assessment.

11.6 Impact Assessment

11.6.1 Do Nothing Scenario

If the proposed development were not to proceed, noise levels in the locality will remain unchanged as there will be no additional traffic movements or construction noise as a consequence of the proposed development. In addition, there will not be any additional receptors introduced to the locality to be exposed to existing noise levels.

There will be a natural increase in traffic flows over time, but the predicted levels of increase will not cause a noticeable difference in the noise levels on the site.

The site is zoned for regeneration so would be likely to be developed in the future with either residential or enterprise led development. The impact of any future similar development is likely to be comparable to the effects identified in this assessment.

11.6.2 Construction Phase

It should be noted that this assessment is for both the construction and demolition phase of the proposed development.

The impact of construction sound is assessed using the methodology described in TII Guidelines, comparing the level of the sound with the limits in **Table 11.2**.

For the purposes of the construction noise assessment, the noise emissions from the various construction phases/activities at the nearest noise sensitive receptors have been predicted using SoundPLAN acoustic modelling software.

The model was implemented in SoundPLAN version 8.0, which is produced by Braunstein & Berndt GmbH. The SoundPLAN implementation of ISO9613 has been tested in-house by SoundPLAN developers to ensure calculated results are within 0.2dB of the standard.

The model is integrated, allowing noise from all sources, with prediction methodologies to be undertaken simultaneously. The noise model takes into consideration the following parameters:

- Topographical effects
- Atmospheric absorption
- Ground absorption
- Screening effects
- Reflections
- Focusing effects
- Metrological conditions

The model predicts the propagation of noise for each octave-band and source-receiver pair and produces a noise level contour map from which the noise levels at receiver locations can be determined.

The construction equipment as contained within **Table 11.6** have been located centrally within the proposed site. For all construction phases, a worst-case assumption of 16 HGV's per hour have been included within predictions. This is significantly higher than the figure presented in the traffic assessment to ensure the worst case has been considered.

Activity	Plant	L_{Aeq} at 10m
Site clearance/excavation/demolition	Lorries (drive by)	70 dB
	Dozers	87 dB
Earthworks	Dozers	87 dB
	HGV and tippers	84 dB
	Concrete pour	Up to 80 dB
	Place and vibrate	Up to 86 dB
Foundations	Concrete cycle cement	80 dB
	Mixers	74 dB
	Large crane operations	86 dB
Metal Frame	Place and vibrate	80 dB
Road works/Landscaping	Surfacing/rolling	76-86 dB

TABLE 11.6 Typical Noise Levels from Construction Works (Ref: BS 5228)

The majority of construction of the proposed site will take place between 0700 – 1900hrs from Monday to Friday and between 0900 – 1300 on Saturdays. No construction will take place on Sundays or Bank Holidays unless in exceptional circumstances and with prior agreement with Dublin City Council.

The nearest residential receptors to the proposed development site are located along the Eastern edge of Coolock Drive, as presented in **Table 11.7** and illustrated on **Figure 11.3**.

Location (nearest road)	Location (Irish Grid Reference)
ER1 – Coolock Drive	319637, 239752
ER2 – Coolock Drive	319599, 239687
ER3 – Greencastle Road	319804, 239793
ER4 – Greencastle Road	319856, 239728

TABLE 11.7 THIRD PARTY - NOISE SENSITIVE RECEPTOR LOCATIONS

The SoundPLAN predicted construction noise levels are presented in **Table 11.8**.

Sensitive Receptor Location	Predicted noise level dB L_{Aeq}
ER1 – Coolock Drive	49.4
ER2 – Coolock Drive	49.1
ER3 – Greencastle Road	48.1
ER4 – Greencastle Road	48.8

TABLE 11.8 PREDICTED CONSTRUCTION NOISE LEVELS

The predicted levels are considered worse case and are expected to only occur for a short period of time as they assume that all equipment is working continuously at full power. It should be noted that construction noise limits are fixed limits and are irrespective of existing background levels.

The nearest residential locations are across Coolock Drive or the Greencastle Road and the land use in the vicinity is primarily commercial or industrial.

Duration of the construction works will not provide a long-term impact and the predicted levels demonstrate that the noise levels will be below the guideline levels. This is a conservative assumption as in reality during the majority of the construction phase, noise levels will be significantly lower than the predicted levels. In the context of a working day, the LAeq over the averaging period is anticipated to be below the construction noise criteria levels for the vast majority of the construction phase.

The Table below provides a description of the likely significant effects associated with the construction phase of the proposed development.

Descriptor	Assessment	Comment
Quality of Effects	Neutral Effects	The predicted noise levels in Table 11.6 show that the predicted worst-case scenario are lower than the limits provided in the guidelines as outlined in Table 11.1.

Significance of Effects	Slight Effects	The predicted noise levels are lower than the existing background daytime noise levels at all stages after the existing earthworks.
Probability of Effects	Unlikely to Occur	The predicted noise level are shown to be in line with appropriate limits and the proposed hours of operation are during normal daytime hours, which are less sensitive to existing residential properties.
Duration and Frequency of Effects	Short-Term Effects	The demolition and construction on the site would be expected to last between 1 to 7 years
Types of Effects	Do-nothing effects	The impacts of the construction are within appropriate limits for a short-term, they will not cause a significant ongoing impact in the vicinity of the site.

TABLE 11.9 DESCRIPTION OF EFFECTS – CONSTRUCTION PHASE

11.6.3 Operational Phase

As noted, ProPG advises that the noise risk assessment should aim to describe noise levels during a typical worst case 24-hour day now or over the foreseeable future. As the planning permission itself will introduce additional traffic movements into the locality and the normal incremental increase in traffic movements year on year, the 2035 AADT traffic movement data provided by AECOM has been relied upon in predicting the noise impact at future residential locations within and adjacent to the proposed development.

Table 11.10 presents the indicative receptor locations introduced as a consequence of the proposed development.

Location (nearest road)	Location (Irish Grid Reference)
A1 - North East	319735,239742
A1 - North West	319700,239756
A1 - South East	319753,239705
A1 - South West	319717,239720
A2 - North East	319793,239690
A2 - North West	319756,239702
A2 - South East	319807,239649
A2 - South West	319772,239667
B - North East	319764,239658
B - North West	319717,239639
B - South East	319772,239602

Location (nearest road)	Location (Irish Grid Reference)
B - South West	319720,239585
C - North East	319659,239670
C - North West	319613,239679
C - South West	319638,239637
C- South East	319682,239629
D - North East	319695,239723
D - North West	319613,239679
D - South East	319682,239629
D - South West	319638,239637

TABLE 11.10 PROPOSED DEVELOPMENT –INDICATIVE NOISE SENSITIVE RECEPTOR LOCATIONS

As noted in Section 11.3, ProPG advises that the noise risk assessment should aim to describe noise levels during a typical worst case 24-hour day now or over the foreseeable future.

The predicted ambient noise levels at Coolock Drive have been assessed against the initial site risk assessment criteria for the existing noise presented in **Table 11.10.** It should be noted that the daytime measurements are made up of noise from all sources, including contributions from the nearby commercial premises.

Table 11.11 presents the predicted daytime and night-time noise levels as a consequence of transportation movements.

Receptor Location	Predicted noise level		DANAP Category
	Daytime (dB $L_{Aeq, 16hr}$)	Night-time (dB $L_{Aeq, 8hr}$)	
A1 - North East	47.2	42.6	**Desirable**
A1 - North West	53.6	52.6	**Undesirable**
A1 - South East	31.5	29.9	**Desirable**
A1 - South West	41.6	36.9	**Desirable**
A2 - North East	42.6	39.7	**Desirable**
A2 - North West	32.1	30.2	**Desirable**
A2 - South East	43.3	43.2	**Desirable**
A2 - South West	38.7	37.3	**Desirable**
B - North East	38.8	37.2	**Desirable**

Receptor Location	Predicted noise level		DANAP Category
	Daytime (dB $L_{Aeq, 16hr}$)	Night-time (dB $L_{Aeq, 8hr}$)	
B - North West	39	34.2	**Desirable**
B - South East	42.8	42.7	**Desirable**
B - South West	43.5	40.1	**Desirable**
C - North East	43.9	38.8	**Desirable**
C - North West	62.5	56.9	**Undesirable**
C - South West	49.6	44.6	**Desirable**
C- South East	32.5	31.7	**Desirable**
D - North East	46.5	41.5	**Desirable**
D - North West	60.1	55.7	**Undesirable**
D - South East	28.8	26.8	**Desirable**
D - South West	43.6	38.5	Desirable

TABLE 11.11 PREDICTED NOISE LEVELS AT PROPOSED INDICATIVE NOISE SENSITIVE RECEPTORS

The predicted noise levels for the majority of facades fall under the Dublin Agglomeration Noise Action Plan 2013-2018 thresholds of 'Desirable Low Sound Levels' for both daytime and night time. However, three facades fronting on to Coolock Drive would be deemed undesirable and hence mitigation measures will be necessary to protect internal residential amenity.

For the purposes of the assessment, worst case daytime noise levels would equate to the higher end of the ProPG Low-Range Category which states, *"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."*

For the purposes of the assessment, worst case night-time noise levels would equate to the higher end of the ProPG Mid-Range Category which states, *"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."*

The Table below sets out the predicted effects of the proposed development during the operational stage.

Descriptor	Assessment	Comment
Quality of Effects	Neutral Effects	There are no significant noise sources which will affect existing residential properties further away from the site. The noise sensitive receptors which have the greatest potential impact are those associated with the development. The predicted noise levels show that the predicted worst-case scenario is in the low to medium range of the ProPG Guidance. When the good acoustic design as identified is taken into account, the effects will not be perceptible within the proposed units.
Significance of Effects	Slight Effects	The predicted noise levels are lower than the existing background daytime noise levels at all stages after the existing earthworks.
Probability of Effects	Unlikely effects	The site is primarily designed to minimise impact on the proposed residential development, as there will not be a significant impact on the existing properties in the wider area. The mitigation measures will be incorporated into the building design to ensure the ongoing noise effects are minimised.
Duration and Frequency of Effects	Permanent Effects	The proposed site will be expected to last over 60 years
Types of Effects	Do-nothing effects	The site is zoned for regeneration so would be likely to be developed in the future with either residential or enterprise led development. The impact of this development is likely to be similar to future development on the site

TABLE 11.12 DESCRIPTION OF EFFECTS – OPERATIONAL STAGE

11.8 Human Health

The noise impact will not generate any significant impact on human health. The short-term construction phase is shown to be in line with construction limits standards and the site is designed to minimise the impact of noise on the proposed residential units on the site, with mitigation incorporated as required. Similarly, the vibration impacts will not generate any significant impact on human health and there will not be an issue if there is a major accident.

11.7 Mitigation

11.7.1 Construction Phase

While the effect of construction noise is not considered to be significant, the following noise control measures, are recommended in order to minimise noise disturbance.

- To the extent practicable, complete works during standard construction hours. Where practical, organise for deliveries to be made during standard construction hours and carry out loading and unloading away from sensitive receivers. Construction timetabling to minimise noise impacts; this may include time and duration restrictions and respite periods and should be considered after consultation with affected receivers.

- Using quieter construction methods where required and where considered reasonable and feasible. Avoid rock hammering; where possible by using other excavation methods such as jaw crushers and, if unavoidable, use the smallest practical excavator/backhoe and hammer. Use rubber wheeled in preference to steel tracked equipment. Make sure all diesel equipment is fitted with appropriate mufflers (e.g. residential grade). Where acceptable from an occupational health and safety perspective, using quieter alternatives to reversing alarms (such as spotters, closed circuit television monitors and 'smart' reversing alarms), particularly during night time activities.
- Switch off equipment when not in use (including during breaks and down times of more than 30 minutes).
- Where reasonable and feasible, locate haulage routes as far away as possible from residential receivers. Truck movements would be restricted to identified haulage routes.
- Where possible, avoiding using noisy plant simultaneously or close together to avoid cumulative noise impacts.
- Orienting equipment and excavation work sites where possible to reduce noise emissions to sensitive receivers.
- Maintaining equipment in efficient working order.
- Establish a noise complaint handling procedure and respond quickly to resolve any complaints in accordance with WPD's established policy.

All of the measures outlined above will be integrated to the Construction and Demolition Environmental Management Plan to be agreed with the competent authority prior to the commencement of development.

11.7.2 Operational Phase

11.7.2.1 Internal Noise Levels

Both ProPG and BS8233 Guidance on Sound Insulation and Noise Reduction for Buildings, 2014 recommend the following criteria inside dwellings:

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

TABLE 11.13 INDOOR NOISE CRITERIA

The external walls of the development are assumed to comprise of cavity masonry construction of 100mm concrete block (inner), 100mm cavity, 100mm clay brick (outer). This will achieve a sound insulation rating in excess of 50dB R'w.

The external glazing provides inherently lower sound insulation than the walls. Glazing installed in facades will a double-glazed construction, which will be required to provide at least 27.5dB sound insulation. The detail below provides an indicative build-up which will provide sufficient sound reduction:

- 4mm glass – 12mm cavity – 4mm glass.

This provides a sound insulation rating in the region of 28dB Rw.

The worst case L_{Aeq} measurements predicted on the site during the daytime and night time were 62.5dB and 56.9dB respectively.

The minimum sound insulation from the composition of the houses will ensure that the daytime external noise level of 62.5dB will be reduced to an internal level of less than 35dB and the night-time external noise level of 56.9dB will be reduced to an internal level of less than 30dB, which complies with the lowest criteria as defined within World Health Organisation and BS8233 guideline levels.

To ensure that windows do not have to be opened for prolonged periods, it is proposed to also incorporate an acoustic ventilation system into the proposed dwellings closest to the proposed link road and existing roads with an equivalent sound reduction index to the glazing of 31 dB Rw. The specification of the ventilation will provide ventilation rates as presented in **Table 11.14** below.

	Number of bedrooms in dwelling				
	1	**2**	**3**	**4**	**5**
Whole dwelling ventilation rate (l/s)	13	17	21	25	29

Notes:

In addition, the minimum ventilation rate should not be less than 0.3 l/s per m^2 of internal floor area. (This includes all floors, e.g. for a two-storey building add the ground and first floor areas).

This is based on two occupants in the main bedroom and a single occupant in all other bedrooms. This should be used as the default value. If a greater level of occupancy is expected add 4 l/s per occupant

TABLE 11.14 WHOLE DWELLING VENTILATION RATES

The information in relation to background ventilation rates provided does not address the rapid ventilation provision, which will be addressed in the normal way with openable windows in all habitable rooms. The effect will allow people to open windows as desired, but it will not be required to permit background ventilation as this criterion will be addressed mechanically.

11.7.2.2 External Noise Levels

BS8233:2014 states that,

"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 $L_{Aeq,16hr}$". The standard continues… *"These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited."*

It is commonly accepted that an acoustic barrier that completely blocks a direct line of sight with the noise source will provide approximately 10dB attenuation, whilst an acoustic barrier than only permits partial views of the noise source will provide approximately 5dB attenuation.

The layout of the scheme has incorporated significant design measures to maximise the amenity of the external areas:

- A communal external area will be at first floor level, with the building between the external areas and the roads, which will provide in the region of 10dB noise reduction.

- The apartments on the site will be set back from the boundary edge, increasing the separation distance to the road traffic noise and maximising the noise attenuation provided by the balconies themselves.

11.8 Commercial Premises

It is recommended that where air-handling units or other potential sources of mechanical noise are used, that these be located in areas away from residential properties. This will reduce the likelihood of a negative noise impact and resulting noise complaints. Other sources of noise associated with the commercial premises should, where practicable, be treated similarly.

It is recommended that where deliveries to commercial premises are necessary, that these take place during daytime hours only.

11.9 Residual Impacts

A noise impact assessment has been undertaken for the proposed mixed-use development. Construction noise impacts were assessed against BS5228:2014 noise limits and noted to be compliant at all existing residential properties. There will therefore be no residual construction impacts from the proposed development.

The impact of existing and proposed transportation noise sources on the proposed residential development has been assessed. The ProPG Noise Risk Impact has been found to be 'Low-Range' during the day and 'Mid-Range' at night, indicating that a post-consent Acoustic Design Statement is required.

Further to appropriate mitigation measures being incorporated into the proposed development, it was found that operational noise from the proposed development is likely to have a low impact during both the daytime and night-time periods.

Given the above, it can be concluded that residual effects from the construction and operation of the proposed development would not be deemed significant.

11.10 Monitoring

Construction noise has the potential to be audible at the nearest receptors outside of the proposed development. The nearest dwellings will generally be most affected and therefore assessing compliance with noise limits at those 'controlling points' will also ensure compliance at other dwellings further away. The following location has been identified as the controlling point for construction noise.

Location (nearest road)	Location (Irish Grid Reference)
ER1 – Coolock Drive	319669, 239726
ER2 – Greencastle Road	319786, 239704

TABLE 11.15 CONSTRUCTION NOISE MONITORING LOCATION

Noise monitoring shall be conducted by the Site Manager or nominated sub-contractor by trained personnel.

The provisional monitoring programme for each type of activity is:

- When the works start to verify the sound, levels assumed for each of the major items of equipment, and to assess the effectiveness of noise control measures and implementation of this plan.

- At regular intervals during the works, at least every four weeks in line with the site safety inspection, to check ongoing compliance with the construction noise limits.
- During critical phases of construction, such the use of heavy earth moving machinery and other noisy activities within 50 metres of neighbours.
- As required by a construction noise management schedule.

Following each noise survey, any issues identified will be investigated and resolved as quickly as possible.

To minimise the effects from vibration on human receptors, Peak Particle Velocity (PPV) levels in excess of 1 mm/s in any axis, measured external to a building, is considered to represent a significant impact on the occupants of residential buildings (although higher levels may be tolerated in certain instances) in accordance with BS5228-2.

For commercial premises, a level of 2mm/s in any axis is taken as a significant impact on its occupants. If these levels are either predicted to be routinely exceeded or monitoring shows it to be routinely exceeded throughout the construction period for 10 or more days of working in any 15 consecutive days or for a period of 3 or more nights (22:00 – 07:00) of working in any 7 consecutive period or for a total of 40 days or more in any six month period) then further vibration surveys will be required to derive a Vibration Dose Value and to provide a more detailed assessment of human disturbance in accordance with BS6472.

To minimise the risk of structural damage to buildings, vibration levels will be controlled so that when measured at the base of any building (in accordance with BS7385 Part 1) the PPV does not routinely exceed a level of 5mm/s, or 3mm/s for vulnerable buildings. Where these levels are predicted to be exceeded, a more detailed assessment is undertaken to further inform the level of risk of damage, which may subsequently result in the commissioning of an appropriate condition survey.

In addition, where premises or equipment are identified as potentially being susceptible to the effects of vibration, appropriate protection measures are implemented.

Noise and Vibration specialists will undertake a screening assessment of the proposed work programme to establish if any significant vibration generating activities are scheduled to occur (e.g. piling, vibro compaction etc.). Should significant vibration generating activities be identified a detailed assessment will be undertaken to predict vibration levels at all sensitive receptors from the construction and demolition in accordance with the calculation methodology set out in BS5228-2:2009 Annex E comprising the following:

- a detailed construction method statement identifying the rationale for work, proposed working hours and a breakdown of construction methodology;
- site location maps and worksite layout plans detailing the geographical locations of all equipment for each stage of the works;
- a construction equipment schedule showing the number, type and make of equipment used for each stage of the construction;
- details of proposed on-site mitigation measures;

11.11 Human Health and Major Incident

The noise impact will not generate any significant impact on human health. The short-term construction phase is shown to be in line with construction limits standards and the site is designed to minimise the impact of noise on the proposed residential units on the site, with mitigation incorporated as required.

Noise from this site will not be an issue if there is a major accident.

11.12 Worst Case Scenario

As noted throughout this report, this assessment is undertaken using worst-case scenario information and therefore impacts are conservative and reflect the impact under this scenario.

11.13 References

- BS5228-1:2009 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise
- BS5228-2:2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration
- ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development – May 2017
- BS6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting
- BS7385-1:1990 Evaluation and measurement for vibration in buildings. Guide for measurement of vibrations and evaluation of their effects on buildings
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2002); and,
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).
- Good Practice Guidance for the Treatment of Noise during the planning of National Road Schemes (TII, 2014)
- Dublin Agglomeration Environmental Noise Action Plan December 2013 – November 2018 (Dún Laoghaire - Rathdown County Council. 2013)

Appendix 11.1 SoundPlan Noise Output Daytime (see Volume III)