

# Clongriffin Block 5 & 6 LRD

## NOISE IMPACT ANALYSIS REPORT

CLONGRIFFIN  
DUBLIN 13

THE LAND DEVELOPMENT AGENCY

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# 1 Introduction

## 1.1 Report purpose

This report assesses the noise impact of the existing mainly traffic generated background noise on the proposed development and compares the impacts with the relevant standards to establish if these are within the guidelines of the standards and or if any particular mitigation actions are required.

## 1.2 Instruction

DKPartnership (DKP) have been commissioned by The Land Development Agency to carry out the analysis and report for the proposed apartment development Blocks 5 and 6 at Clongriffin, Dublin 13.

This report was prepared by Craig Van Deventer, director at DKPartnership. Craig has over 35 years experience in consulting engineering and the measurement and assessment of environmental noise including the preparation of noise and vibration impact assessments and EIARs (Noise and Vibration chapter). Furthermore, he has experience in acoustic measurement relating to environmental projects, infrastructure projects and building acoustics.

## 1.3 Brief development description

The proposed development will principally provide for 408 apartments in two blocks, as follows:

Block 5 ranges in height between 3- and 6-storeys and provides as follows:

138 no. apartments (comprising 58 x 1 bed; 78 x 2 bed and 2 x 3 bed units);

Community / Arts and Cultural space of 502 sq.m at ground floor level;

Integrated ESB substation and associated switch room;

Communal open spaces are provided at podium level (736 sq.m) and at 4th floor level in the form of a roof terrace (143 sq.m).

Block 6 ranges in height between 4- and 7-storeys and provides as follows:

270 no. apartments (comprising 122 x 1 bed and 148 x 2 bed units);

a childcare facility of 413 sq.m (with an ancillary play area of 98 sq.m);

707 sq.m of Community / Arts / Cultural space at ground floor level;

2 no. Integrated ESB substations and associated switch rooms.

Communal open space (2,762 sq.m) is provided at podium level in a courtyard over car parking at ground level.

Other associated works include:

Proposed Roadworks - construction or extension of surrounding streets to enable access to the development via the existing Clongriffin road network. These street elements to be constructed include Dargan Street (located between Block 5 and Block 6), as well as sections of Park Street, Lake Street, and Market Street. All internal roads, kerbs, footpaths, hard and soft landscaping, public lighting, bicycle stands, car spaces, EV charging points.

Public Open Space in the form of a landscaped pocket park of 1,433 sq.m in area (Grant Park) to the east of Blocks 5 and 6.

Access and Parking - Each of the proposed blocks has an internal (undercroft / below podium level) car parking area. The Block 5 undercroft parking shall be accessed from Park Street, at the site's western boundary. That of Block 6 shall be accessed from Lake Street, at the site's eastern boundary. Provision is made for 268 no. car parking spaces (comprising 163 off-street spaces below podium level and 105 no. on-street parking spaces).

Bicycle Parking - Provision is made for 858 no. bicycle parking spaces (comprising 638 no. residents cycle parking spaces; 206 no. visitor spaces; 4 bicycle spaces to serve the staff of the childcare facility along with 10 childcare visitor spaces).

## 4.1 Definitions to Legislation and guidelines

The following guideline / standards have been applied:

- British Standard BS 8233 Sound insulation and noise reduction for buildings. BS 8233 contains guidance on the minimum recommended levels of noise reduction from external sources and general guidance on maximum habitable room noise standards.
- British Standard 7445-1. Defines parameters, procedures and instrumentation for noise measurement and analysis.
- World Health Organisation (WHO). Chapter 11, Guidance on Environmental noise. Published External Environmental Noise Guidelines for the European Region which sets out how noise pollution in towns and cities is increasing, and that excessive noise particularly from transport sources is a health risk.
- EPA NG4 : Irelands Guidance note for noise. Licence applications, surveys and assessments in relation to scheduled activities..
- Fingal development plan 2023-2029 and Dublin Airport Local Area Plan 2020.



### 1.4 Geographical overview

Image 3.1 of the site is an overview of the site area with the proposed development approximately outlined in yellow.

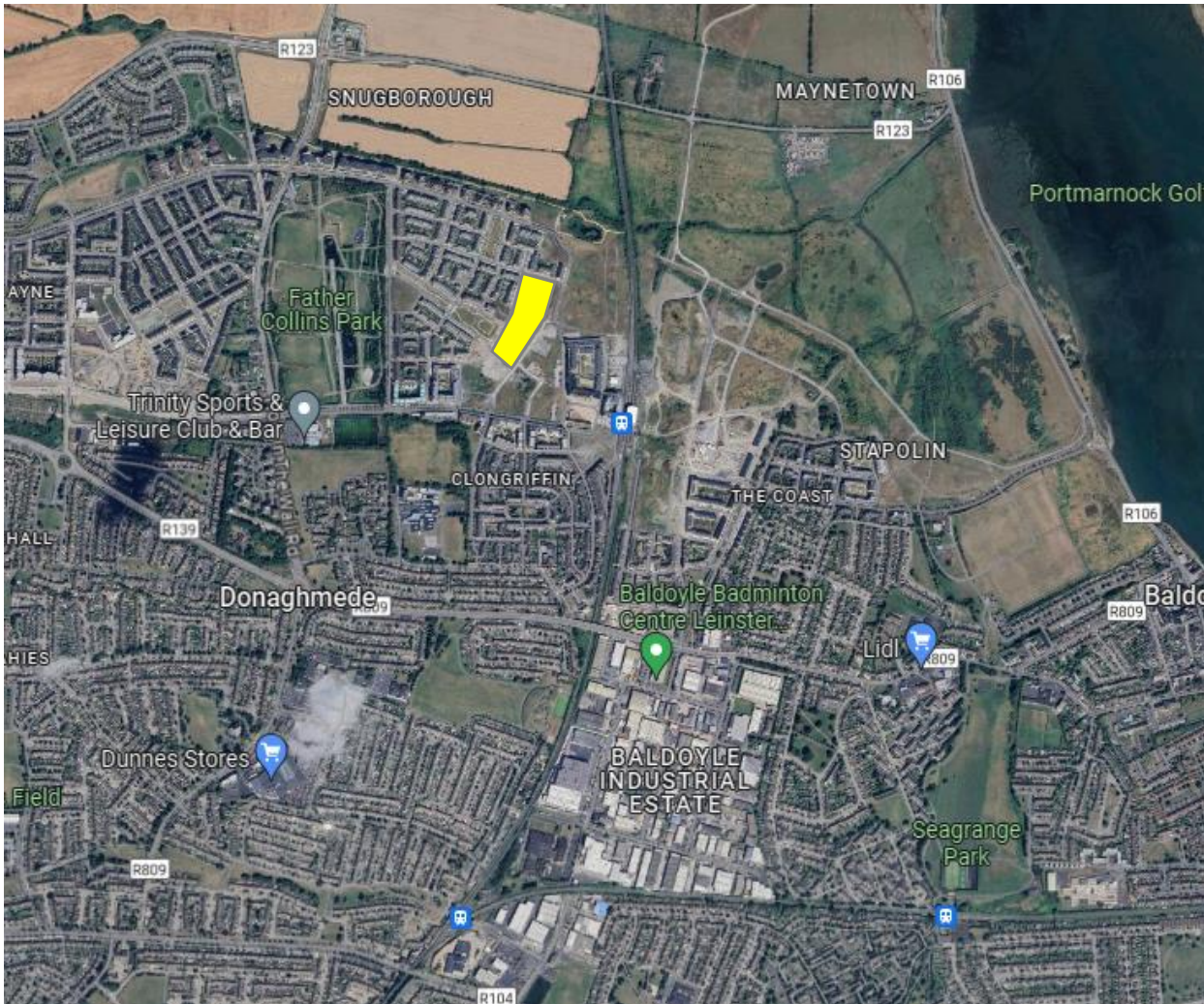


Image 1.1: Google site location map with approximate project location.



## 2 Executive summary

### 2.1 Analysis conducted

This report analyses potential noise impacts of aircraft noise from Dublin Airport on the proposed development and any noise impacts of the proposed development on new or existing residential units and compares these with the relevant standards to establish if these are within the guidelines of the standards.

### 2.2 Standards and regulations overview. See 4.2 for definitions.

The following guideline/standards have been applied and used for information:

- The British Standard BS 8233.
- The World Health Organisation (WHO).
- EPA noise guide NG4.
- Dublin Airport Noise LAP / Fingal Development Plan 2023-2029.

### 2.3 Development noise environment

The apartment blocks 5 and 6 are located in the middle of the overall Clongriffin residential site. The noise exposure apart from Dublin airport noise is mainly from modest urban traffic. Railway noise was not deemed to be having any adverse effect as the project is some 300m from the railway tracks with numerous noise obstacles (4/5 storey buildings) in its noise path.

### 2.4 Background noise and relevant impact assessment methodology

For the report we used the data from an unmanned (24hour) background noise survey, the EPA current (round 4) noise maps and the Fingal/DCC Noise action plan and Dublin airport LAP noise zones. Any potential noise nuisance impacts on the proposed development are compared with the EPA/WHO/BSEN8233 maximum recommended noise exposure and resultant ambient internal noise criteria (NC) for habitable rooms.

### 2.5 Background noise levels.

As noted above we applied the noise data of 3 no. different background noise sources; 1) A background noise survey, 2) the Fingal/DCC noise action plan and Dublin airport LAP noise zone map and 3) the EPA Dublin airport noise maps.

1) The noise survey data; The table below details the summarised noise data from the noise survey location covering the average weighted noise levels for daytime (16h) and night time (8h) periods. T Leq16 and Leq8 data are weighted averages across the respective periods and will be used to compare against the above noted standards, regulations and guidelines.

Background noise level	7.00-23.00 L <sub>den</sub> L <sub>AEQ16</sub>	23.00-7.00 L <sub>night</sub> L <sub>AEQ8</sub>	
Survey point A	57 dB(L <sub>AEQ16</sub> )	46 dB(L <sub>AEQ16</sub> )	
Survey point B	56 dB(L <sub>AEQ16</sub> )	45 dB(L <sub>AEQ16</sub> )	

Copy of table 5.2. Survey Background noise exposure table.

2) The Dublin airport noise zones; . The current noise zones (2023-2029) are based on noise exposure from an expanded Dublin Airport including a new north runway. The basis of the noise zones was underpinned by relevant guidance in relation to aircraft noise and its effects available at that time. With the north runway partially operational updated information is available relating to aircraft noise performance and flight paths. For these reasons, it is considered appropriate to update the noise zones for Dublin Airport to allow for more effective land use planning for development within airport noise zones. According to the updated maps the project location to be in zone "C".

Background noise	7.00-23.00 L <sub>den</sub> / L <sub>AEQ16</sub>	23.00-7.00 L <sub>night</sub> / L <sub>AEQ8</sub>	Assessment / Action.
Zone C	56 – 60 dB	46 – 50 dB	Noise impact need to be considered

Copy of table 5.1. Dublin airport noise mediation criterion table.





3) EPA noise maps; The round 4 (most current) EPA noise contour maps show the Daytime (L<sub>den</sub>) and night time (L<sub>night</sub>) contours. The table below details the of the projects exposure according to the relevant EPA maps.

Background noise level	7.00-23.00 L <sub>den</sub> L <sub>AEQ16</sub>	23.00-7.00 L <sub>night</sub> L <sub>AEQ8</sub>	
EPA noise map	50-55	40-45	

Copy of table 5.3. EPA noise map Background noise exposure table.

Applied for internal room ambient noise calculations; The table below details the calculated internal ambient noise levels using the highest noise exposure data between the noise survey data, the Dublin airport noise zones and the Dublin airport EPA noise maps @ 60dB L<sub>AEQ16</sub> day time and 50dB L<sub>AEQ8</sub> night time background levels. When subtracting the noise reduction capability of the conservative “standard” noise reduction @ 25.5dB and current construction methods and materials using double glazing @ 35.5dB respectively the resultant internal noise levels are as follows;

Location	7.00-23.00 L <sub>den</sub> / L <sub>AEQ16</sub>	23.00-7.00 L <sub>night</sub> / L <sub>AEQ8</sub>
Highest background noise data	60	50

Table 2.1: Background noise data used for internal room ambient noise level calculations.

## 2.6 Façade noise reduction capability

The development will be of current construction standards as directed under the Building Regulations, i.e. the National Building Regulations published by the Department of Housing, Local Government and Heritage Building (as amended 2024) and in particular Part L, requirement would have a high level airtightness standard giving the construction a relative high noise reduction capability. For this report we have applied 2 different capabilities, 1 – Conservative “standard” noise reduction @ 25.5dB and 2 – Noise reduction capability based on current construction methods and materials @ 35.5dB as highlighted in table 4.4 below.

	Solid walls (dB,DLnt,w)	Glazing (dB,DLnt,w)	Façade average (dB,DLnt,w)	Comments
2022 Current new build	56	33	35.5	Double glazing
2002 Building regulations	45	25	25.5	

Extract from table 4.4: Typical new construction noise façade reduction capability.

## 2.7 Predicted noise levels in habitable rooms as a result of aircraft noise..

The development will be of current construction standards and as part of the building regulations and in particular The table below details the calculated internal ambient noise levels using the highest noise exposure data between the noise survey data, the Dublin airport noise zones and the Dublin airport EPA noise maps @ 60dB L<sub>AEQ16</sub> day time and 50dB L<sub>AEQ8</sub> night time background levels. When subtracting the noise reduction capability of the conservative “standard” noise reduction @ 25.5dB and current construction methods and materials using double glazing @ 35.5dB respectively the resultant internal noise levels are as follows;

Location	7.00-23.00 L <sub>den</sub> / L <sub>AEQ16</sub>	23.00-7.00 L <sub>night</sub> / L <sub>AEQ8</sub>
Internal area / room (façade reduction 2002)	60-25.5= 34.5	50-25.5= 24.5
Internal area / room (façade reduction 2022) Double G	60-35.5= <b>24.5</b>	50-35.5= <b>14.5</b>

Copy of table 5.4: Calculated internal average ambient noise levels.

## 2.8 Proposed roof mounted equipment noise impact.

The proposed development has 2 no external roof mounted plant area's, 1 no on block 5 with 6 no condensers and 1 no on block 6 with 12 no. condensers. The equipment represent the air conditioning outdoor units (condensers) and are grouped together in a dedicated plant area. The dedicated area's are surrounded by a visual and acoustic screen to lower the visual impact of the plant and absorb noise emitted by the condenser.

Block 5 roof plant area contains 6 no condensers and when running 100% simultaneously generate a noise level of



59.57dB within the enclosure of the plant area . Table 5.6 details the actual noise emissions at 1 m intervals from the plant area using the lowest noise reduction capacity of the proposed acoustic screen (18dB @ 63Hz – Appendix B). Block 6 roof plant area contains 12 no condensers and when running 100% simultaneously generate a noise level of 62.79dB within the enclosure of the plant area . Table 5.7 details the actual noise emissions at 1 m intervals from the plant area using the lowest noise reduction capacity of the proposed acoustic screen (18dB @ 63Hz – Appendix B). The respective noise calculation data using 1m intervals show that at 2m distance from the plant area the noise exposure is +/-36dB and +/-36dB for block 5 and 6 respectively which are well within the maximum EPA recommended daytime (55dB) and nighttime (45dB) façade exposure, Both plant areas do not face any windows or doors eliminating the risk of any noise nuisance complaints.

## 2.9 Conclusion.

The overall site's calculated combined noise exposure from the aircraft of the DAA flight path and mainly local urban traffic are showing the average day time noise exposure of the site general area to be in the region of 56dB to 57dB day time exposure and between 45dB to 46dB night time exposure. which is within and/or near the the EPA maximum recommended day time and night time façade expose guidelines of 55dB and 45dB respectively. Railway noise from the far East of the overall site was not deemed to be having any adverse effect as the project is some 300m from the railway tracks with numerous noise obstacles (4/5 storey buildings) in its noise path. The resultant internal area / room day time and night time levels as shown in table 5.4 using the current construction methods with double glazing when comparing these with the WHO/CIBSE/BS8233 recommended maximum internal noise level environments shown in table (4.2) are categorised as "Very good " .

The table below shows the WHO/CIBSE/BS8233 recommended maximum habitable room noise levels.

Room type	Very good / Country	Good / Suburban	Reasonable / Urban	City centre
Sleeping environment	25	30	35	40
Living environment	30	35	40	45

Copy of Table 4.2: WHO internal room noise environment categories.

We note that noise ingress is subject to the noise barrier (façade) to be homogenous as any permanent openings within the barrier will or can have significant effects on the internal noise environment hence any such openings are to be avoided as noted in section 2.9, Mitigation.

Roof equipment area noise : The proposed roof plant areas are confined to a dedicated screened area on each block containing the proposed condensers. The proposed condensers have relative low noise emission levels at 52dB @ 1m each (appendix A). When operating the condenser 100% simultaneously it equates to a combined noise level of 57.79dB for block 5 and 62.79dB for block 6. Both roof plant area are fitted with a 1.5m heigh acoustic screen with a minimum reduction capacity of 18dB @ 63Hz. (Appendix B). From the noise calculation data using the 1m intervals we note that at a distance of 2m from the plant area the noise exposure is +/-36dB and +/-36dB for block 5 and 6 respectively which are well within the maximum EPA recommended daytime (55dB) and nighttime (45dB) façade exposure, The fact that that both roof plant area are only facing solid walls directly without doors or windows means that a further noise reduction across the solid walls will eliminates any risk of noise nuisance complaints. Tonal noise has also been considered however we note that the noise spectrum of the proposed condenser is deemed non tonal as it does not exceeds the level of the adjacent bands on both sides by 5dB or more if the centre frequency of the band containing the tone is above 400 Hz.

Therefore, based on the above we, DKP, deem this to be satisfactory and within the standards and regulations noted.

## 2.10 Recommendations and / or mitigation measures

Whereas the current calculated noise exposure in the internal areas / rooms using current construction methods with double glazing option would be deemed satisfactory we recommend to mitigate against noise nuisance issues by the following recommendations;

- To have no ventilation or other permanent openings without acoustic treatment in the facades and roofs.
- To have ventilation or other openings with a noise reduction capability of  $\geq 30$ dB in all facades and roof.
- To ensure that any acoustic screen proposed for the roof plant areas is equal to the specification as listed in appendix B (100mm)





### 3 Survey location

The following locations have been used for the background noise survey.

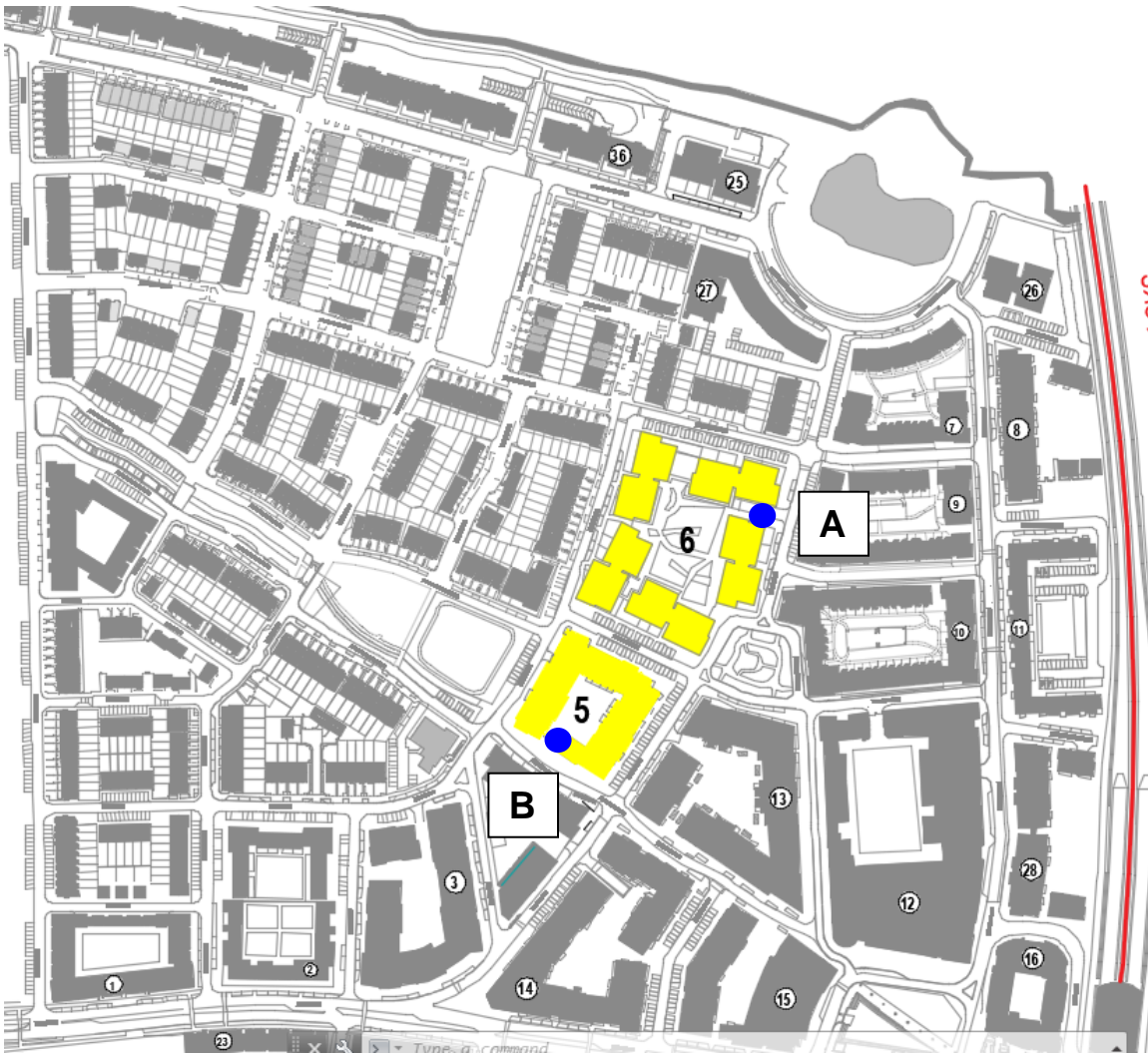


Image 3.1: Site map and noise survey point A and B location:

## 4 Approach, methodology and calculation results

### 4.2 Methodology applied

For the report an unmanned noise survey was conducted as to verify the existing background levels near or at the new proposed development and comparing the relevant effects on the proposed development with the EPA guide, WHO/BSEN8233 maximum recommended noise exposure and resultant ambient internal noise criteria (NC) for habitable rooms.

### 4.3 Legislation and guidelines

The following guideline / standards have been applied:

- British Standard BS 8233 Sound insulation and noise reduction for buildings. BS 8233 contains guidance on the minimum recommended levels of noise reduction from external sources and general guidance on maximum habitable room noise standards.
- British Standard 7445-1. Defines parameters, procedures and instrumentation for noise measurement and analysis.
- World Health Organisation (WHO). Chapter 11, Guidance on Environmental noise. Published External Environmental Noise Guidelines for the European Region which sets out how noise pollution in towns and cities is increasing, and that excessive noise particularly from transport sources is a health risk.
- EPA NG4 Guidance note for noise. Licence applications, surveys and assessments in relation to scheduled activities..
- Fingal development plan 2023-2029 and Dublin Airport Local Area Plan 2020.

### 4.4 Irelands noise framework

As noted in the EPA LG4 guide environmental noise is unwanted sound arising from all areas of human activity such as noise from transport (road, rail, air traffic) as well as from industrial activities. The EPA is the national authority for overseeing the implementation of the Regulations. The EPA has made available the strategic noise mapping of agglomeration, major airports, major roads and major rail networks, in the form of noise contours for the  $L_{den}$  (day, evening, night) and  $L_{night}$  (night) periods. A noise map is a graphical representation of the predicted situation with regards to noise in a particular area with different colours representing different noise levels in decibels dB(A). All noise maps are presented in terms of two noise indicators:  $L_{den}$  and  $L_{night}$ .

- $L_{den}$  is the day-evening-night noise indicator and it represents the noise indicator for overall annoyance. It is 'weighted' to account for extra annoyance in the evening and night periods. The Environmental Noise Directive defines an  $L_{den}$  threshold of 55 dB for reporting on the numbers of people exposed.
- $L_{night}$  is the night time noise indicator and is used in the assessment of sleep disturbance. An  $L_{night}$  threshold of 50 dB is defined for reporting on the numbers of people exposed. These indicators are based on year long averages of the day (07:00-19:00), evening (19:00-23:00) and night (23:00-07:00) time periods.

### 4.5 Background noise criterion at the facades of residential receptors

The table below shows the different noise categories as published by BS 8233 in residential areas for the day time and night time periods with the relevant assessment criterion.

Background noise	7.00-23.00 $L_{den}$ / $L_{Aeq16}$	23.00-7.00 $L_{night}$ / $L_{Aeq8}$	Assessment / Action.
Cat "A"	<= 55 dB	<= 45 dB	Noise need not to be considered
Cat "B"	55 – 66 dB	45 – 59 dB	Noise impact need to be considered
Cat "C"	66 – 72 dB	59 – 66 dB	Noise impact mitigation need to be considered
Cat "D"	> 72 dB	> 66 dB	Unless quieter sites are not available residential use should not be considered

Table 4.1: Noise nuisance assessment criterion.



#### 4.6 Maximum recommended room noise level guidelines

The table below shows the maximum recommended noise levels for residential dwellings as published by the world Health Organisation for habitable rooms in different environments as illustrated below.

Room type	Very good / Country	Good / Suburban	Reasonable / Urban	City centre
Bed room	25	30	35	40
Living room	30	35	40	45
Working environment	32.5	37.5	42.5	47.5

Table 4.2: WHO internal room noise environment categories.

#### 4.7 Predicted noise nuisance complaints

As published by BS 8233, the noise nuisance criterion table detailed below shows the predicted level of compliant for residential dwellings as a result of exceeding the particular sound level. This table is an appraisal in term of both the margin of excess above the measured background noise and existing sound environment which may already have a high ambient or residual sound level. It is also noted that not all differences or impacts lead to complaints and that not every complaint is proof of an adverse impact.

Level over the background noise	Compliant indication
10 dB or more	Likely to cause noise nuisance complaints
5 dB	May give rise to some extend of noise nuisance complaints
0 dB	Unlikely to give rise to noise nuisance complaints

Table 4.3: Change to noise environment noise complaints prediction indication.

#### 4.8 Façade noise reduction capability

All facades have a noise reduction capability and this report has applied typical noise reduction data as per table C.1. in appendix C of the national building regulations TGD Part E and window/wall manufactures data. Typical façade noise reduction capabilities are calculated using the resultant noise reduction capability of typical sound reducing (absorption coefficients) of both the solid and glazed elements.

	Solid walls (dB,DLnt,w)	Glazing (dB,DLnt,w)	Façade average (dB,DLnt,w)	Comments
2022 Current new build	56	40	43.5	Triple glazing
2022 Current new build	56	33	35.5	Double glazing
2002 Building regulations	45	25	25.5	
1982 Building regulations	47	21	22.4	

Table 4.4: Typical façade noise reduction averages as per table C1 TGD Part E and manufacturers noise data.



## 5 Development noise exposure assessment

### 5.1 Development noise exposure.

The illustration below shows the relevant apartment blocks 5 and 6 in context of the overall Clongriffin site. The noise exposure apart from air craft noise is mainly urban traffic. Railway noise was not deemed to be having any adverse effect as the project is some 300m from the railway tracks with numerous noise obstacles (4/5 storey buildings) in its noise path.

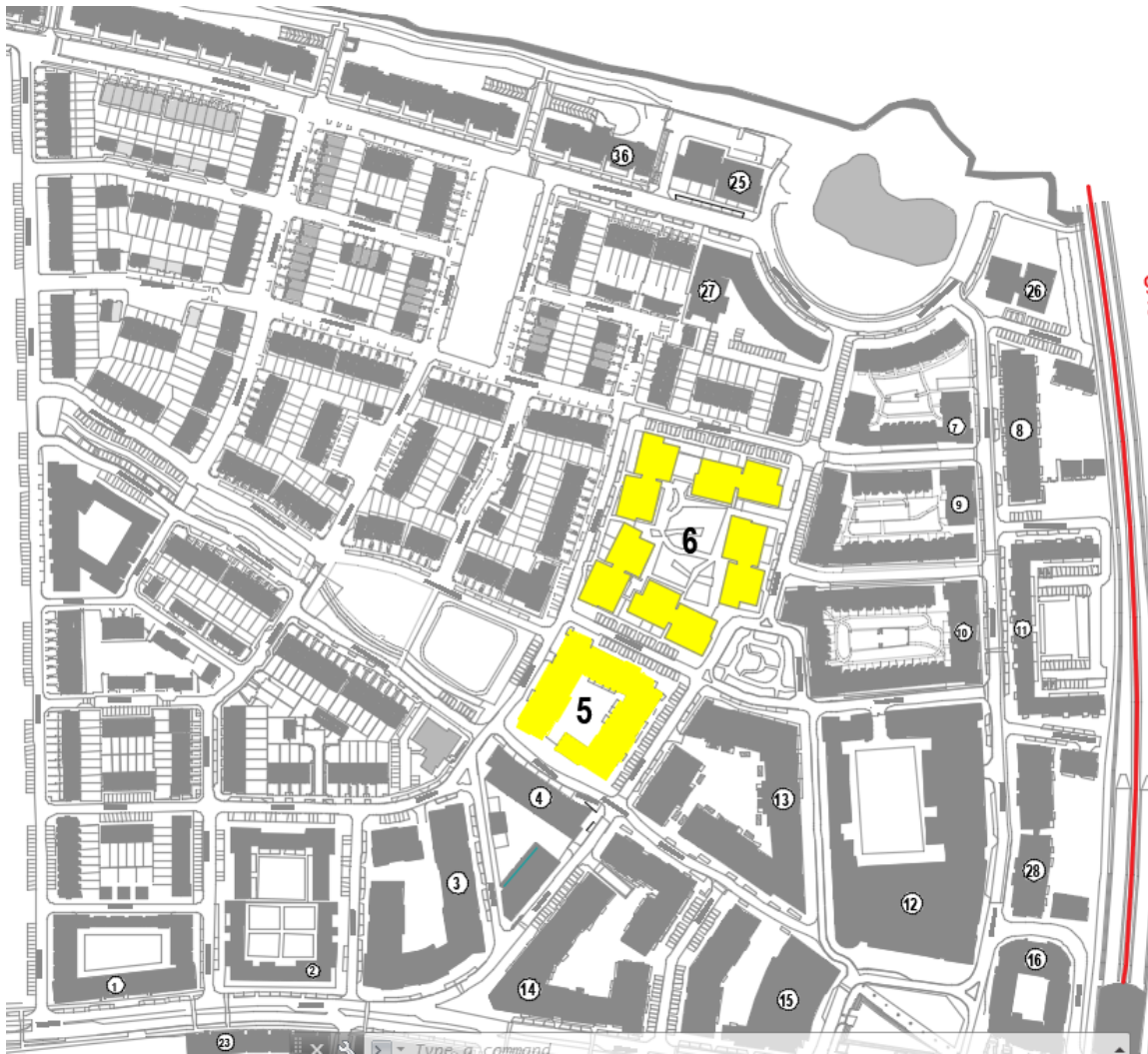


Image 5.1: Overall Clongriffin residential site map with block 5 and 6 highlighted.

### 5.2 Dublin airport noise Zones.

The Fingal Dublin Airport LAP (2023-2029) is a land use plan for the purposes of effective land-use planning and safeguarding the use of the Airport. Noise zones relating to Dublin Airport have been in place for many years to aid land use planning, with the current noise zones first contained in the Fingal Development Plan. The current noise zones (2023-2029) are based on noise exposure from an expanded Dublin Airport including a new north runway. The north runway has become operational in 2022 and updated information was applied relating to aircraft noise performance and flight paths. For these reasons, it is considered appropriate to update the noise zones for Dublin Airport to allow for more effective land use planning for development within airport noise zones.

The following maps show the project location to be in zone “C” according the Fingal Dublin Airport LAP and Fingal Development Plan 2023-2029.



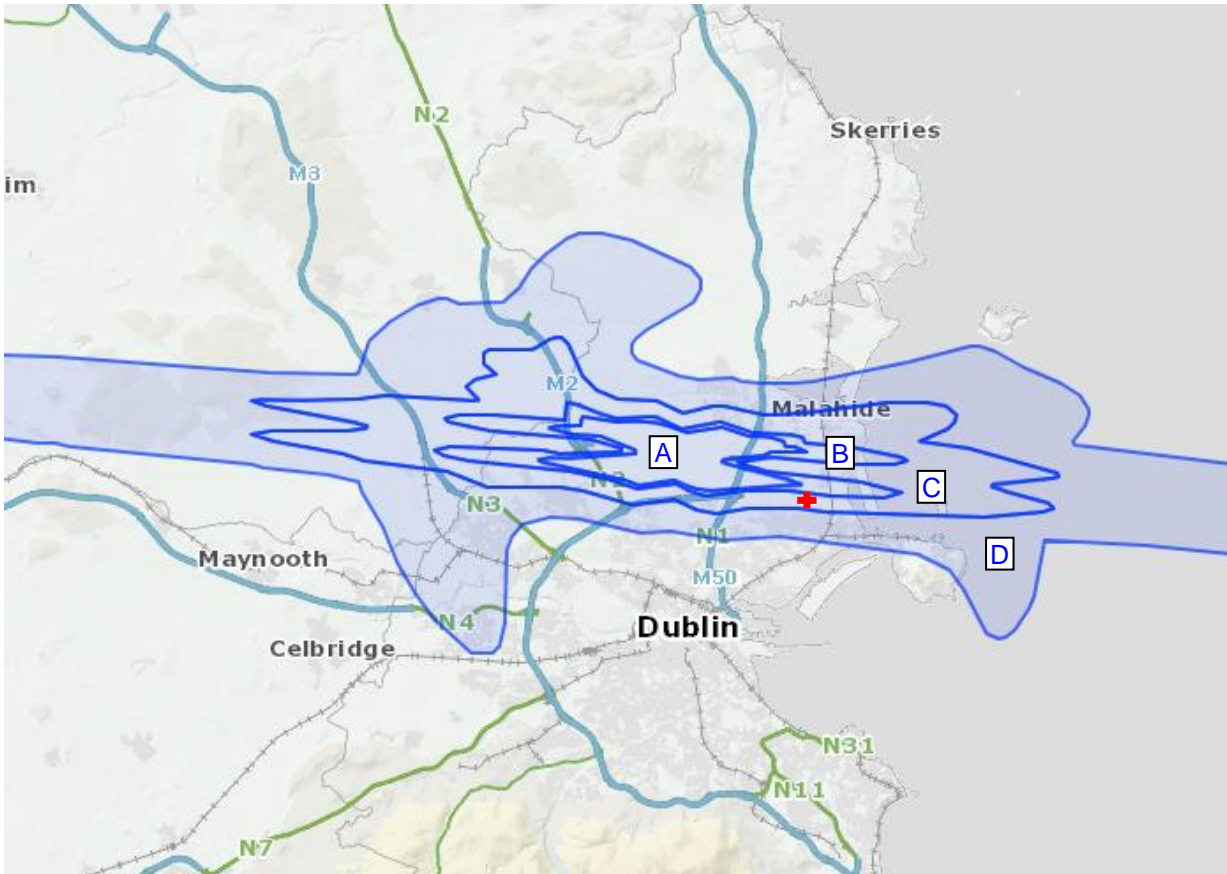


Image 5.2: 2023 -2024 Dublin Airport LAP and Fingal noise action plan on-line noise map of the greater airport zone area with project location.

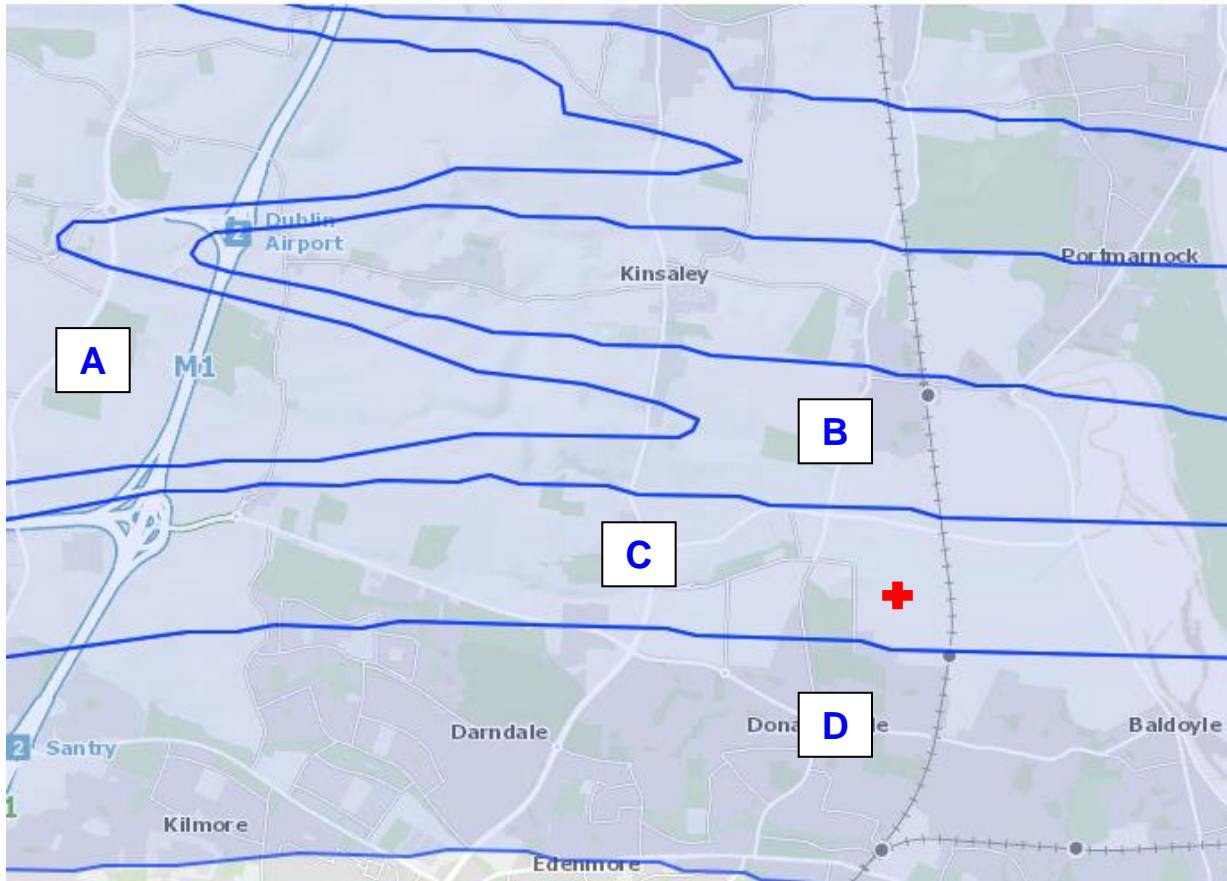


Image 5.3: 2023 -2024 Dublin Airport LAP and Fingal noise action plan on-line noise map including the Clongriffin area with project location.





Below is the Dublin airport LAP zone noise details table with the relevant zone highlighted.

Background noise	7.00-23.00 L <sub>den</sub> / L <sub>AEQ16</sub>	23.00-7.00 L <sub>night</sub> / L <sub>AEQ8</sub>	Assessment / Action.
Zone D	<= 55 dB	<= 45 dB	Noise need not to be considered
Zone C	56 – 60 dB	46 – 50 dB	Noise impact need to be considered
Zone B	61 – 65 dB	51 - 55 dB	Noise impact mitigation need to be considered
Zone A	> 65 dB	> 55 dB	Noise impact mitigation required

Table 5.1. Dublin airport noise mediation criterion table.

### 5.3 Background noise level survey.

To establish the background noise in the general area of the proposed development we conducted an unmanned survey over a 1 day 24 hour (16hour + 8hour) period located as show on the noise survey point location map. The table below details the summarised noise survey data from the noise survey location covering the maximum sound exposure and maximum noise level measured together with the average weighted equivalent noise levels for daytime (16h) and night time (8h) periods. We note that the sound exposure and maximum noise level data is only given for general information as this relates to a single (short time) event whereas the Leq16 and Leq8 are weighted averages across the respective periods and will be used to compare against the above noted standards, regulations and guidelines.

Background noise level	7.00-23.00 L <sub>den</sub> L <sub>AEQ16</sub>	23.00-7.00 L <sub>night</sub> L <sub>AEQ8</sub>	
Survey point A	57 dB(L <sub>AEQ16</sub> )	46 dB(L <sub>AEQ16</sub> )	
Survey point B	56 dB(L <sub>AEQ16</sub> )	45 dB(L <sub>AEQ16</sub> )	

Table 5.2. Survey Background noise exposure table.

The measurements taken are considered representative of typical noise levels in the area. The noise survey measurements have been performed using a Bruel & Kjaer Type 2260 sound level meter/recorder and data logger. Calibration was conducted using a Bruel & Kjaer 4231 sound level calibrator. All measurements were carried out in accordance with ISO 1996: 'Acoustics-Description and measurement of environmental noise'. Weather conditions during the survey were in line with the conditions described within ISO 1996, Acoustics 'Description and Measurements of Environmental Noise'. Weather conditions were dry and cool with a moderate wind. The survey was conducted on Friday May 10<sup>th</sup>, 2024.

### 5.4 EPA noise maps round 4. (most current)

EPA noise contour maps available show L<sub>den</sub> and L<sub>night</sub> contours. L<sub>night</sub> is the A-weighted long-term average sound level for the night time period (23.00 to 07.00). L<sub>den</sub> – is the A-weighted long-term average sound level for the day-evening-night noise indicator in decibels (24 hours).

Background noise level	7.00-23.00 L <sub>den</sub> L <sub>AEQ16</sub>	23.00-7.00 L <sub>night</sub> L <sub>AEQ8</sub>	
EPA noise map	50-55	40-45	

Table 5.3. EPA noise map Background noise exposure table.

The following noise maps below are based on the round 4 EPA noise monitoring of Dublin airport aircraft noise and also show the project location within the map.



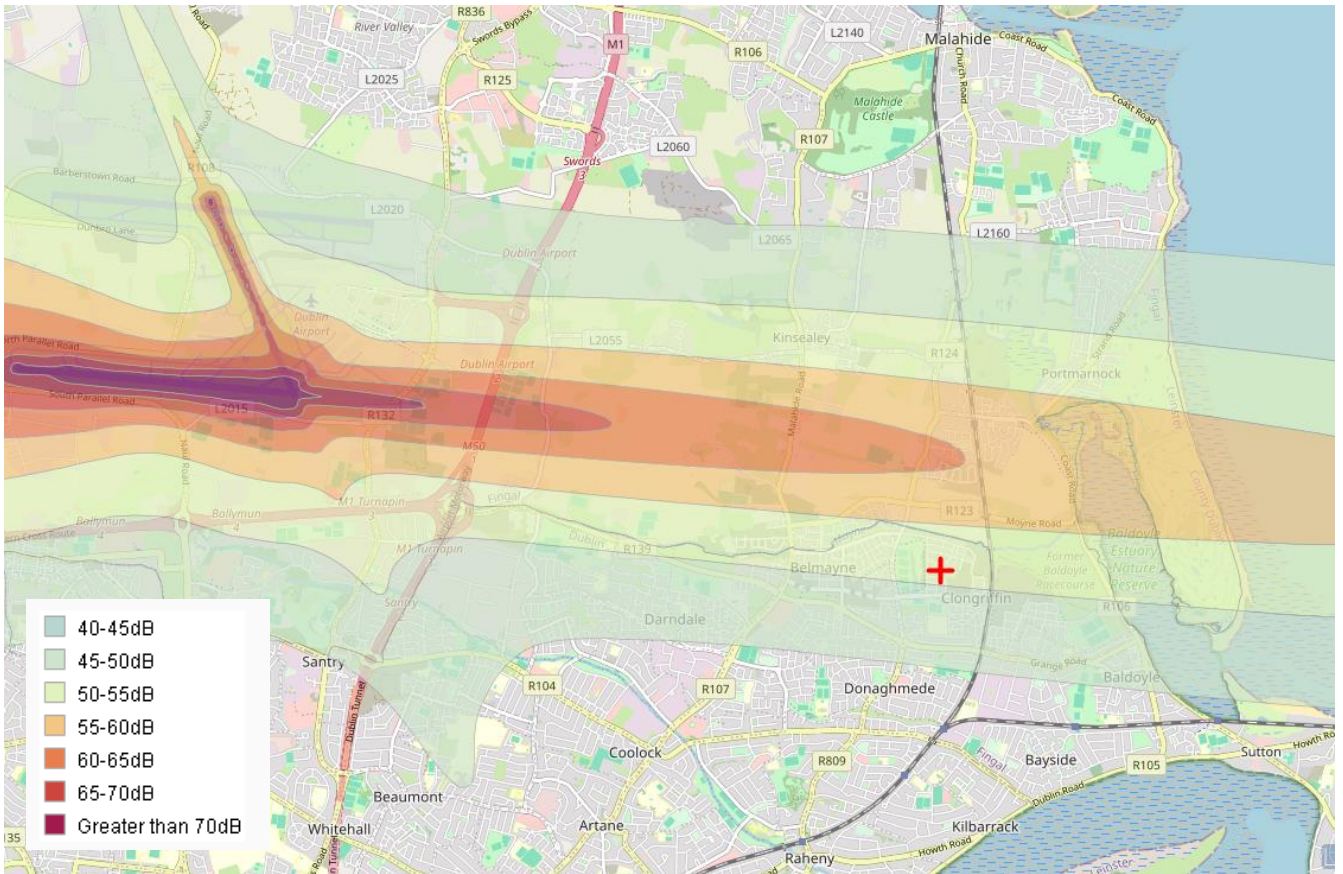


Image 5.4: Round 4 EPA Daytime airport noise map with approximate project location.

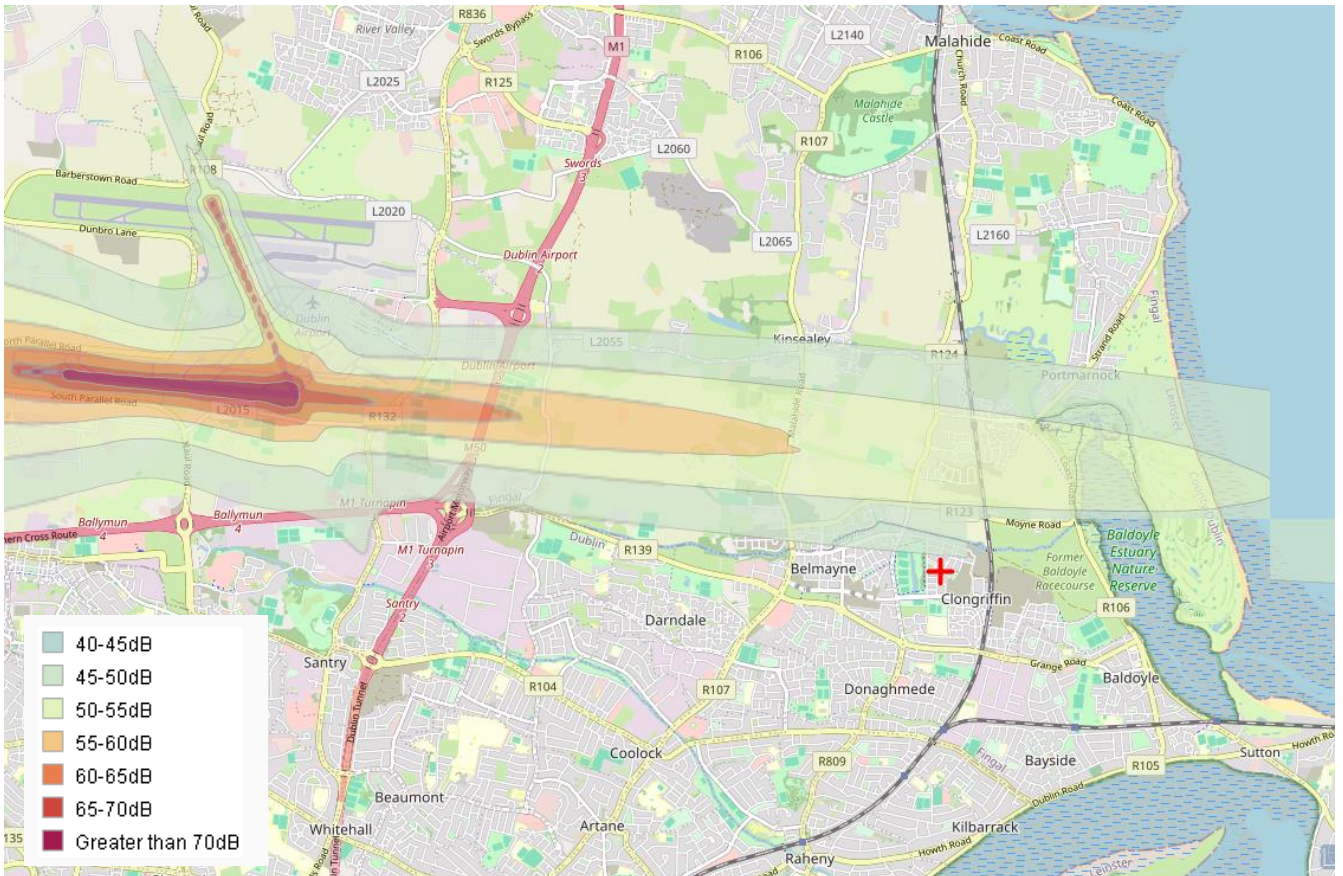


Image 5.5: Round 4 EPA Nighttime airport noise map with approximate project location.



### 5.5 Background noise impact assessment criterion

To determine any possible actions from the survey day time background (façade exposure) noise levels and night time noise levels we compare these with the noise impact assessment criterion table 4.1 and note the noise levels to fall in the “B” category where the noise impact needs consideration.

Background noise	7.00-23.00 $L_{den} / L_{AEQ16}$	23.00-7.00 $L_{night} / L_{AEQ8}$	Assessment / Action.
Cat “A”	$\leq 55$ dB	$\leq 45$ dB	Noise need not to be considered
Cat “B”	55 – 66 dB	45 – 59 dB	Noise impact need to be considered
Cat “C”	66 – 72 dB	59 – 66 dB	Noise impact mitigation need to be considered
Cat “D”	$> 72$ dB	$> 66$ dB	Unless quieter sites are not available residential use should not be considered

Copy of Table 4.1; EPA Noise assessment criterion table.

### 5.6 Façade noise reduction capability

The development will be of current construction standards and as part of the building regulations and in particular Part L, requirement would have a high level airtightness standard giving the construction a relative high noise reduction capability. For this report we have applied 2 different capabilities, 1 – Conservative “standard” noise reduction @ 25.5dB and 2 – Noise reduction capability based on current construction methods and materials @ 35.5dB. as highlighted in table 4.4 below.

	Solid walls (dB,DLnt,w)	Glazing (dB,DLnt,w)	Façade average (dB,DLnt,w)	Comments
2022 Current new build	56	40	43.5	Triple glazing
2022 Current new build	56	33	35.5	Double glazing
2002 Building regulations	45	25	25.5	
1982 Building regulations	47	21	22.4	

Copy of table 4.4: Typical new construction noise façade reduction capability.

### 5.7 Predicted noise levels in habitable rooms and amenity spaces as a result of background noise

The table below details the calculated internal ambient noise levels using the highest noise exposure data between the noise survey data, the Dublin airport noise zones and the Dublin airport EPA noise maps @ 60dB  $L_{AEQ16}$  day time and 50dB  $L_{AEQ8}$  night time background levels. When subtracting the noise reduction capability of the conservative “standard” noise reduction @ 25.5dB and current construction methods and materials using double glazing @ 35.5dB respectively the resultant internal noise levels are as follows;

Location	7.00-23.00 $L_{den} / L_{AEQ16}$	23.00-7.00 $L_{night} / L_{AEQ8}$
Internal area / room (façade reduction 2002)	60-25.5= 34.5	50-25.5= 24.5
Internal area / room (façade reduction 2022) Double G	60-35.5= 24.5	50-35.5= 14.5

Table 5.4: Calculated internal average ambient noise levels.

### 5.8 Proposed roof mounted equipment noise impact.

The proposed development has 2 no external roof mounted plant area’s, 1 no on block 5 with 6 no condensers and 1 no on block 6 with 12 no. condensers. The equipment represent the air conditioning outdoor units and are grouped together in a dedicated plant area. The dedicated area’s are surrounded by a visual and acoustic screen to lower the visual impact of the plant and absorb noise emitted by the condenser.

Plant noise emissions : The following are the proposed plant emission details

Receptor ID	Source distance m	Noise level day time dB(Leq16)	Noise level night time dB(Leq8)	Source type	Source type
1 no. Condensor	1.0	52.00	52.00	Condensor	WAMACK AW140
Block 5 condensers combined (6)	1.0	59.78	59.78	Condensor x 6	WAMACK AW140
Block 6 condensers combined (12)	1.0	62.79	62.79	Condensor x 12	WAMACK AW140

Table 5.5: Single and combined condenser noise emissions.





Plant location : The plant areas are confined to 2 no dedicated areas, 1 no for block 5 and 1 no for block 6 as shown below. The block 5 external roof plant area contains 6 no condenser, the block 6 external roof plant area contains 12 condensers..

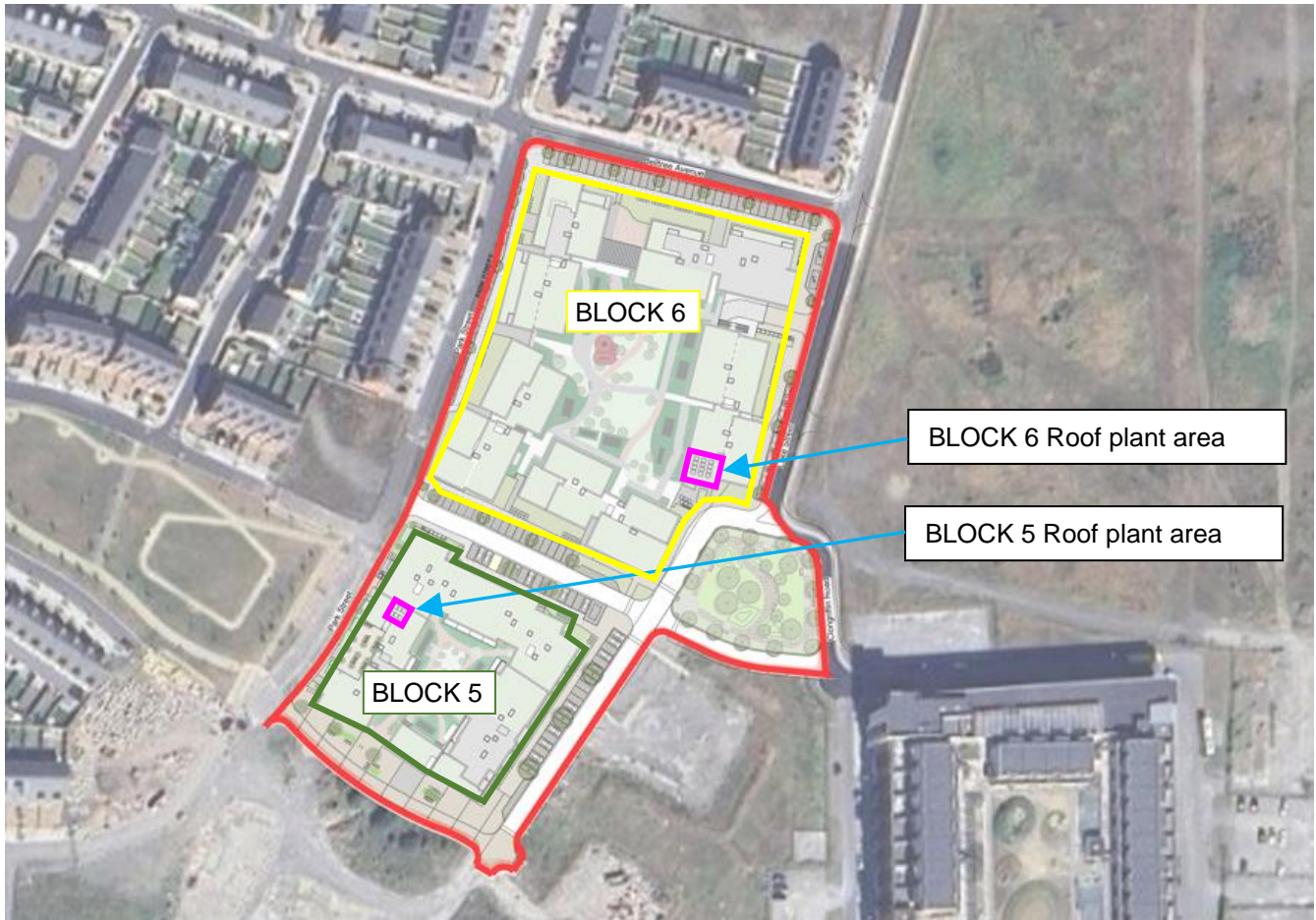


Image 5.6: Block 5 and 6 location and roof mounted equipment area locations.

**BLOCK 5.**

Block 5 roof plant area contains 6 no condensers and when running 100% simultaneously generate a noise level of 59.57dB within the enclosure of the plant area . Table 5.6 details the actual noise emissions at 1 m intervals from the plant area using the lowest noise reduction capacity of the proposed acoustic screen (18dB @ 63Hz – Appendix B).

Receptor ID	Wamak6	Condensor x 6	Noise data as a result of external plant				Receptor exposure day dB(Leq16)	Receptor façade night dB(Leq8)
			Noise level weighted day time dB(Leq16)	Noise level weighted night time dB(Leq8)	Air borne noise reduction dB	Other noise reduction dB		
@ 1m	Wamak6	1	59.78	59.78		18.0	41.8	41.8
@ 2m	Wamak6	2	59.78	59.78	6.0	18.0	35.8	35.8
@ 3m	Wamak6	3	59.78	59.78	9.5	18.0	32.2	32.2
@ 4m	Wamak6	4	59.78	59.78	12.0	18.0	29.7	29.7
@ 5m	Wamak6	5	59.78	59.78	14.0	18.0	27.8	27.8
@ 6m	Wamak6	6	59.78	59.78	15.6	18.0	26.2	26.2
@ 7m	Wamak6	7	59.78	59.78	16.9	18.0	24.9	24.9
@ 8m	Wamak6	8	59.78	59.78	18.1	18.0	23.7	23.7
@ 9m	Wamak6	9	59.78	59.78	19.1	18.0	22.7	22.7
@ 10m	Wamak6	10	59.78	59.78	20.0	18.0	21.8	21.8
@ 11m	Wamak6	11	59.78	59.78	20.8	18.0	21.0	21.0
@ 12m	Wamak6	12	59.78	59.78	21.6	18.0	20.2	20.2
@ 13m	Wamak6	13	59.78	59.78	22.3	18.0	19.5	19.5
@ 14m	Wamak6	14	59.78	59.78	22.9	18.0	18.9	18.9
@ 15m	Wamak6	15	59.78	59.78	23.5	18.0	18.3	18.3

Table 5.6: Block 5 Roof plant room noise emission data table.



The condenser noise data was taken from the manufacturers data sheet of the proposed condensers. We note that at a distance of 2m from the plant area the noise exposure is +/-36dB which is well within the maximum EPA recommended daytime (55dB) and nighttime (45dB) façade exposure, The fact that that the plant area is only facing solid walls directly without doors or windows means that a further noise reduction across the solid will eliminates risk of noise nuisance complaints.

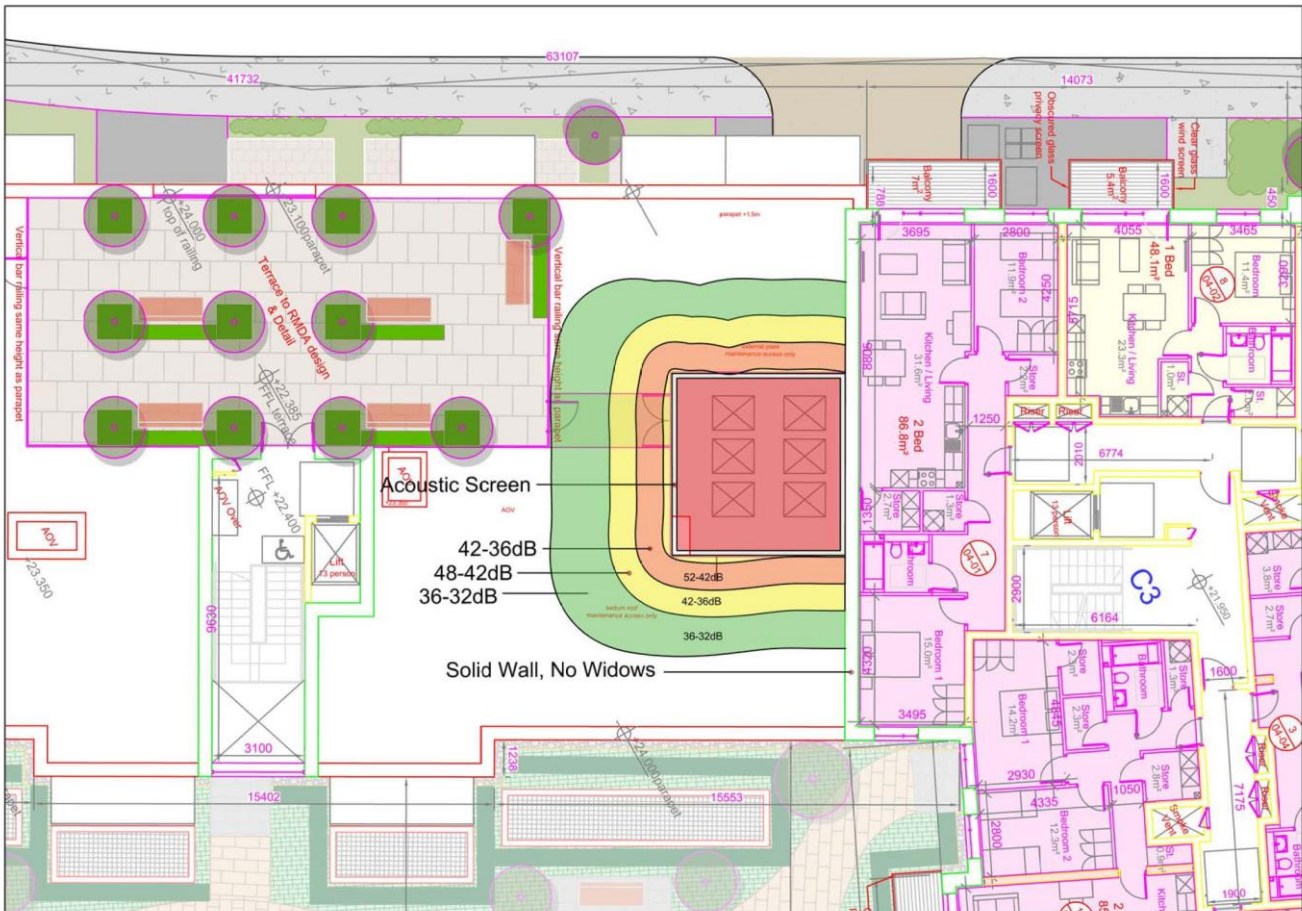


Illustration 5.7: Block 5 Roof plant room noise zones.

**BLOCK 6.**

Block 6 roof plant area contains 12 no condensers and when running 100% simultaneously generate a noise level of 62.79dB within the enclosure of the plant area . Table 5.7 details the actual noise emissions at 1 m intervals from the plant area using the lowest noise reduction capacity of the proposed acoustic screen (18dB @ 63Hz – Appendix B).

Wamak12 Condensor x 12		Noise data as a result of external plant						
Receptor ID	Noise source	Source to Receptor distance m	Noise level weighted day time dB(Leq16)	Noise level weighted night time dB(Leq8)	Air borne noise reduction dB	Other noise reduction dB	Receptor exposure day dB(Leq16)	Receptor façade night dB(Leq8)
@ 1m	Wamak12	1	62.79	62.79		18.0	44.8	44.8
@ 2m	Wamak12	2	62.79	62.79	6.0	18.0	38.8	38.8
@ 3m	Wamak12	3	62.79	62.79	9.5	18.0	35.2	35.2
@ 4m	Wamak12	4	62.79	62.79	12.0	18.0	32.7	32.7
@ 5m	Wamak12	5	62.79	62.79	14.0	18.0	30.8	30.8
@ 6m	Wamak12	6	62.79	62.79	15.6	18.0	29.2	29.2
@ 7m	Wamak12	7	62.79	62.79	16.9	18.0	27.9	27.9
@ 8m	Wamak12	8	62.79	62.79	18.1	18.0	26.7	26.7
@ 9m	Wamak12	9	62.79	62.79	19.1	18.0	25.7	25.7
@ 10m	Wamak12	10	62.79	62.79	20.0	18.0	24.8	24.8
@ 11m	Wamak12	11	62.79	62.79	20.8	18.0	24.0	24.0
@ 12m	Wamak12	12	62.79	62.79	21.6	18.0	23.2	23.2
@ 13m	Wamak12	13	62.79	62.79	22.3	18.0	22.5	22.5
@ 14m	Wamak12	14	62.79	62.79	22.9	18.0	21.9	21.9
@ 15m	Wamak12	15	62.79	62.79	23.5	18.0	21.3	21.3





Table 5.7: Block 6 Roof plant room noise emission data table.

The condenser noise data was taken from the manufacturers data sheet of the proposed condensers. We note that at a distance of 2m from the plant area the noise exposure is +/-39dB which is well within the maximum EPA recommended daytime (55dB) and nighttime (45dB) façade exposure, The fact that that the plant area is only facing solid walls directly without doors or windows means that a further noise reduction across the solid will eliminates risk of noise nuisance complaints.

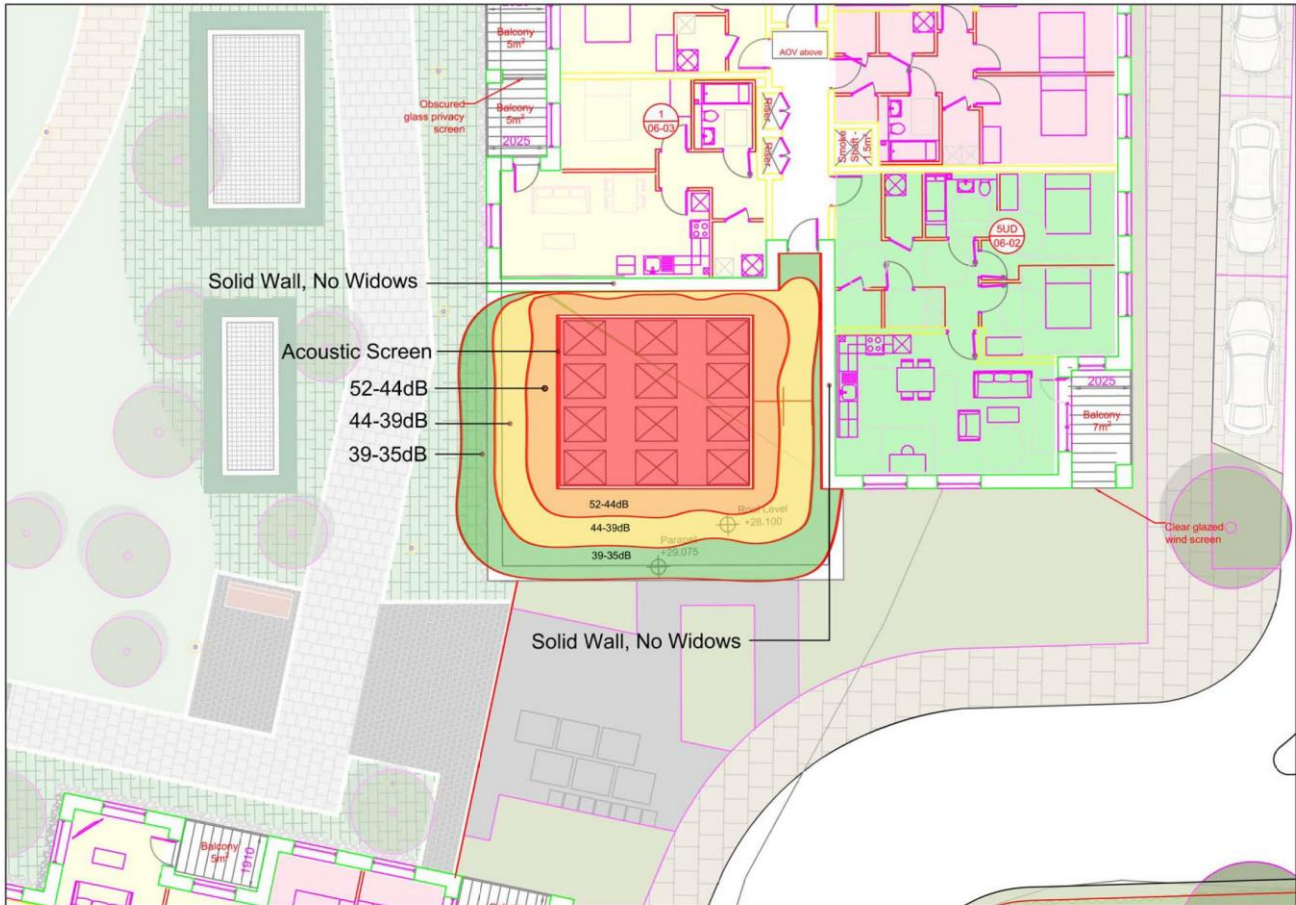


Illustration 5.8: Block 6 Roof plant area with noise zones.

5.9 Conclusion

Aircraft noise ; The overall site’s calculated combined noise exposure from the aircraft of the DAA flight path and mainly local urban traffic are showing the average day time noise exposure of the site general area to be in the region of 56dB to 57dB day time exposure and between 45dB to 46dB night time exposure which is within and/or near the EPA maximum recommended day time and night time façade expose guidelines of 55dB and 45dB respectively. Railway noise from the far East of the overall site was not deemed to be having any adverse effect as the project is some 300m from the railway tracks with numerous noise obstacles (4/5 storey buildings) in its noise path.

The resultant internal area / room day time and night time levels as shown in table 5.4 using the current construction methods with double glazing when comparing these with the WHO/CIBSE/BS8233 recommended maximum internal noise level environments shown in table (4.2) are categorised as “Very good “.

The table below shows the WHO/CIBSE/BS8233 recommended maximum habitable room noise levels.

Room type	Very good / Country	Good / Suburban	Reasonable / Urban	City centre
Sleeping environment	25	30	35	40
Living environment	30	35	40	45

Copy of Table 4.2: WHO internal room noise environment categories.



We note that noise ingress is subject to the noise barrier (façade) to be homogenous as any permanent openings within the barrier will or can have significant effects on the internal noise environment hence any such openings are to be avoided as noted in section 5.9, Mitigation.

Roof equipment area noise : The proposed roof plant areas are confined to a dedicated screened area on each block containing the proposed condensers. The proposed condensers have relative low noise emission levels at 52dB @ 1m each (appendix A). When operating the condenser 100% simultaneously it equates to a combined noise level of 57.79dB for block 5 and 62.79dB for block 6.

Both roof plant areas are fitted with a 1.5m high acoustic screen with a minimum reduction capacity of 18dB @ 63Hz. (Appendix B). From the noise calculation data using the 1m intervals we note that at a distance of 2m from the plant area the noise exposure is +/-36dB and +/-36dB for blocks 5 and 6 respectively which are well within the maximum EPA recommended daytime (55dB) and nighttime (45dB) façade exposure, The fact that that both roof plant area are only facing solid walls directly without doors or windows means that a further noise reduction across the solid walls will eliminate any risk of noise nuisance complaints. Tonal noise has also been considered however we note that the noise spectrum of the proposed condenser is deemed non tonal as it does not exceeds the level of the adjacent bands on both sides by 5dB or more if the centre frequency of the band containing the tone is above 400 Hz.

Therefore, based on the above we, DKP, deem this to be satisfactory and within the standards and regulation noted.

#### 5.10 Recommendations and / or mitigation measures

Whereas the current calculated noise exposure in the internal areas / rooms using current construction methods with double glazing option would be deemed satisfactory we recommend to mitigate against noise nuisance issues by the following recommendations;

- a) To have no permanent ventilation or other permanent openings without acoustic treatment in the facades and roofs.
- b) To have ventilation or other openings with a noise reduction capability of  $\geq 30$ dB in all facades and roof.
- c) To ensure that any acoustic screen proposed for the roof plant areas is equal to the specification as listed in appendix B (100mm)



## APPENDIX A      Condenser data sheet





# AW 140 EVI HeavyDuty

Technical information - heat pump			
Type :	AW 140 EVI HeavyDuty	latest data update :	
Article code :	WAHD1345	Language :	English
Nominal performance data according to EN 14511			
Heating capacity :	137.7 kW	Input :	37.23 kW
Refrigerating capacity :	100.47 kW	COP :	3.7
* Data at conditions A2°C/W35°C			
Nominal performance data for cooling in reverse mode			
Cooling capacity - reverse operation :	143.1 kW	ERR :	4.2
Input - reverse operation :	34.2 kW	* Data at conditions A35°C/W18°C	
Operating temperature limitations			
Source temperature minimal :	-22°C	Flow temperature minimal :	+12°C
Source temperature maximal :	+40°C	Flow temperature maximal :	+65°C
Mechanical data			
Width :	1050 mm	Weight inside :	920 kg
Depth :	2100 mm	Weight outside :	3 x 210 kg
Height :	1300 mm	Outdoor unit type :	VOV900 (3)
Noise emissions			
Noise emissions inside Lp ( 1m ) :	52 dB(A)	Noise emissions outside Lp ( 10m / max. RPM ) :	48 dB(A)
Refrigerant circle parameters			
Refrigerant :	R410A	Orifice inside :	EEV
Refrigerant volume :	3x14.0 kg	Orifice economizer :	EEV
Surcharge of refrigerant over 8 meter distance IU/OU :	3x(0.35) kg/m	Orifice outside :	EEV
* air - water SPLIT heat pumps are delivered without refrigerant charge and only pressured with nitrogen			
Pipe dimensions, flow rates , pressure drops			
Connecting dimensions - primary side :	3x(22mm / 35mm)	Pressure drop - primary side :	3x0.061 kPa
Connecting dimensions - secondary side :	3 x 2 "	Pressure drop - secondary side :	max 20 kPa
Flow - primary side :	13983 ~ 41950 m <sup>3</sup> /hour	Recommended ΔT source :	7 K
Flow - secondary side :	6.05 ~ 18.15 m <sup>3</sup> /hour	Recommended ΔT consumer :	5 K
Maximum water pressure consumer :	6 bar		
Electrical parameters			
Main connection cable - dimension :	5x25 mm <sup>2</sup>	Current - nominal :	3x20.8 A

## APPENDIX B Acoustic fence data sheet







**Panel Acoustic Performance**  
**Sound Reduction Index to ISO 10140-2:2010**

Acoustic Panel		Sound Reduction (dB) at Octave Band Centre Frequency (Hz)								Rw (dB)
Depth	Product Code	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
75mm	WA-ACP-D75	18	25	33	41	48	50	50	50	44
100mm	WA-ACP-DI00	18	25	35	44	49	50	50	50	45
100mm	WA-ACP-DI00P	18	25	40	48	50	50	50	50	48
100mm	WA-ACP-DI00S	19	25	41	48	50	50	50	50	48
150mm	WA-ACP-DI50	19	25	40	46	50	50	50	50	47





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