



6070

# EXTERNAL AIRCRAFT NOISE ANALYSIS

DUBLIN AIRPORT NOISE ASSESSMENT

## AUBURN HOUSE

RESIDENTIAL MIXED USE DEVELOPMENT

**Auburn House**  
**Malahide**  
**Dublin**

Kinwest Ltd

**DKP-M72-6070-1P**  
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## 1 Introduction

### 1.1 Report purpose

This report assesses the Dublin airport noise emissions potentially impacting the new proposed development site at Auburn House. Airport noise impacts for future residents were assessed and evaluated using current data and monitoring results obtained from the Environmental Protection Agency (EPA) and Dublin Airport. Aircraft noise levels within the area are compared against recommendations set out in the relevant standards to establish if any particular mitigation actions are required and if appropriate.

### 1.2 Instruction

DKPartnership (DKP) have been commissioned by Kinwest Ltd to carry out the analysis and report for the proposed Auburn House residential development at Malahide, Co. Dublin.

### 1.3 Development description

The proposed development will consist of the preservation and protection of the existing Protected Structure of Auburn House as 1 no. residential dwelling, the conversion of the existing stables of Auburn House to accommodate 4 no. dwellings and the construction of 406 no. residential dwellings, apartments and duplexes providing for an overall total of 411 no. residential units. See the schedule of accommodation below. A childcare facility with 173 sqm of area is also proposed as part of the scheme.

Description		1-Bed	2-Bed	3-Bed	4-Bed	5-Bed or more	Total
Houses <i>(including Auburn house and converted stables)</i>		1	2	46	39	14	102 houses*
Apartments	Block 1	27	22	2	-	-	51
	Block 2	29	27	1	-	-	57
	Block 3	27	22	2	-	-	51
	Block 4	9	17	1	-	-	27
	Block 5	6	22	-	-	-	28
	Block 6	5	14	2	-	-	21
	Block 7	-	6	-	-	-	6
	Block 8	6	17	2	-	-	25
Duplexes	Block 1	1	3	2	-	-	6
	Block 2A	6	2	-	-	-	8
	Block 2B	8	3	-	-	-	11
	Block 2C	7	2	-	-	-	9
	Block 2D	5	4	-	-	-	9
<b>Total</b>		<b>137</b>	<b>163</b>	<b>58</b>	<b>39</b>	<b>14</b>	<b>411*</b>

## 2 Executive summary

### 2.1 Analysis conducted

This report details the potential for noise impacts relating to Dublin Airport from Aircrafts. Airport noise impacts for future occupancy were assessed and evaluated using current data and monitoring results obtained from EPA noise maps and Dublin Airport. Monitoring results indicate the percentage of the different noise events types. Average noise levels for the years 2017-2020 were assessed for Daytime noise level  $L_{Aeq,16h}$  and Night-time noise level  $L_{Aeq,8h}$ . Airport noise levels within the area are compared with the maximum recommended noise data for residential units published by the world health organisation, CIBE guides and BS8233.

### 2.2 Standards and regulations overview

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

The European Environmental Noise Regulations 2018 (S.I. No. 549), the National Planning Framework 2040, the British Standard BS 8233 and the World health Organisation (WHO), Dublin Airport Noise Management Plan.

### 2.3 Site location

The new proposed development site at Auburn House is located in Malahide. Malahide is a coastal area in Fingal, County Dublin, situated approximately 18km north-east of Dublin city. The Auburn House project is a new development in the grounds of the existing Auburn House with the main entrance just of the Malahide Road and Back Road junction. The site is approximately 8km from Dublin Airport. On inspection the new proposed development site at Auburn House is located outside the area of Dublin Airport's noise contour map, however, Fingal County Council's County Development Plan 2017 - 2023 has defined noise zones A-D, with zone A having the most potential for noise exposure during airport operations. The new proposed development site at Auburn House is located in zone D, where the zone is identified as 'likely to be acceptable from a noise perspective'. As this is a proposed residential site we have carried out an assessment to examine if any mitigation measures are necessary.

### 2.4 Back ground noise and relevant impact assessment methodology

For the report no particular site noise survey was conducted as the EPA have accurate data available from their Feltrim noise measuring station which is located in between the Auburn House Development and the Dublin Airport flight path and as such is ideally located for the noise impact assessment. Both the Feltrim noise measuring station data and the EPA day time and night time noise maps data are applied to calculate and predict the noise levels at the Auburn House site and assess any potential noise nuisance impacts on the new proposed development in Auburn House by comparing the data with the CIBSE/WHO/BS8233 and or others maximum recommended Noise Criteria (NC) for habitable rooms. Noise level prediction calculations are calculated using " $L_r = L_w \cdot 20 \log_{10} \cdot m - 10.9$ " where  $m$  = the distance to the receiver. Section 5.5 details the noise prediction calculation data.

### 2.5 Calculated noise levels at the facades and noise assessment criterion

From table 5.2 below we note that the average weighted back ground noise levels including the air craft noise levels from the Feltrim noise measurement station and EPA noise maps for both the day time and night time periods resulted in day time noise levels of 47.9 to 50.6 dB and night time noise levels of between 43.8 to 48.2 dB.

Average back ground noise level	7.00-23.00 $L_{den} / L_{Aeq16}$	23.00-7.00 $L_{night} / L_{Aeq8}$	
Auburn House site	47.9 – 50.6 dB	43.8 – 47.2 dB	

Table 5.3

We note the day time noise levels to fall in the "A" category where no consideration to noise levels is required and night time noise levels marginally in the "B" category where the noise impact would need some consideration. See table 4.1 for full criterion assessment schedule.

Back ground noise	7.00-23.00 $L_{den} / L_{Aeq16}$	23.00-7.00 $L_{night} / L_{Aeq8}$	Assessment / Action.
Category "A"	$\leq 55$ dB	$\leq 45$ dB	Noise impact need not to be considered
Category "B"	55 – 66 dB	45 – 59 dB	Noise impact need to be considered

Table 5.4

## 2.6 Façade noise reduction capability

The new proposed development will be of modern construction and as part of the new building regulations and in particular Part L, requirement will need to have a high level airtightness standard giving the construction a relative high noise reduction capability. For this report we have applied conservative “standard” noise reduction capabilities.

	Solid external walls	Glazing	Façade average	Comments
Noise reduction capability standard	> 50 dB	35 dB	35.5 dB	Applied for assessment

Table 5.5

## 2.7 Predicted noise levels in habitable rooms

The resultant internal ambient room noise levels shown in the table below are the results of the Feltrim noise measurement station maximum noise levels less the average façade noise reduction capability (35.5dB) of the facades (table 5.5) of the new proposed development.

Calculated internal room noise level after façade noise reduction from back ground noise.

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>
Closets façade to flight path	15.1 dB	11.7 < dB

Table 5.6

## 2.8 Conclusion

Comparing the calculated internal room noise levels ranging from 15.1 dB(A) during the day time (7.00-23.00) period and 11.7 during the night time (23.00-7.00) period shown in table 5.6 with the WHO/CIBSE/BS8233 recommended maximum habitable room noise level shown in table (5.7) below we conclude that the resultants noise levels are below the “Very good / Country” levels and we deem this to be satisfactory and within the recommendations of the relevant standards and guides.

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
Bed room	25	30	35	40
Living room	30	35	40	45

Table 5.7

## 2.9 Recommendations and / or mitigation measures

No mitigation measures anticipated but just to ensure that the above internal room “Very good” ambient noise level standards are met by the facades to have a noise reduction capability of  $\geq 35$ dB and any openings i.e. ventilation grills, should have a noise reduction capability of  $\geq 37$ dB.

### 3 Geographical overview

#### 3.1 Project overview

Image 3.1, the (google maps) site map below is a basic overview of the site with proposed development approximately outlined in the area site map.



Image 3.1



## 4 Approach and methodology

### 4.1 Methodology applied

For the report no particular site noise survey was conducted as the EPA have accurate data available from their Feltrim noise measuring station which is located in between the Auburn House Development and the Dublin Airport flight path and as such is ideally located for the noise impact assessment. Both the Feltrim noise measuring station data and the EPA day time and night time noise maps data are applied to predict the noise levels at the Auburn House site and assess any potential noise nuisance impacts on the new proposed development in Auburn House by comparing the data with the CIBSE/WHO/BSEN8233 and or others maximum recommended Noise Criteria (NC) for habitable rooms.

### 4.2 Irelands noise framework

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. This role includes noise mapping and action planning for the purpose of the Directive. 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.

### 4.3 Legislation and guidelines

The following guideline / standards have been applied:

- National Planning Framework 2040. Document sets out the Government's planning policies for Ireland and how these are expected to be applied. the aim is to prevent both new and existing development from contributing to or being put at unacceptable risk from or being adversely affected by unacceptable levels of noise pollution
- European Environmental Noise Regulations 2018 (S.I. No. 549). (Environmental Noise Regulations 2006).
- 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). 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.
- ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise
- Fingal development plan 2017-2023

### 4.4 Back ground noise criterion at the facades of residential receptors

The table below shows the different noise categories as published by BS 8233 in residential area's 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"	$\leq 55$ 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

Table 4.1



#### 4.5 Maximum recommended room noise level guidelines

The table below shows the maximum recommended noise levels for residential dwellings as published by BS 8233, CIBSE and 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

Table 4.2

#### 4.6 Predicted noise nuisance complaints

The table 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 back ground 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 back ground 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

### 5 Development noise emission assessment

#### 5.1 Dublin Airport noise contour maps

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

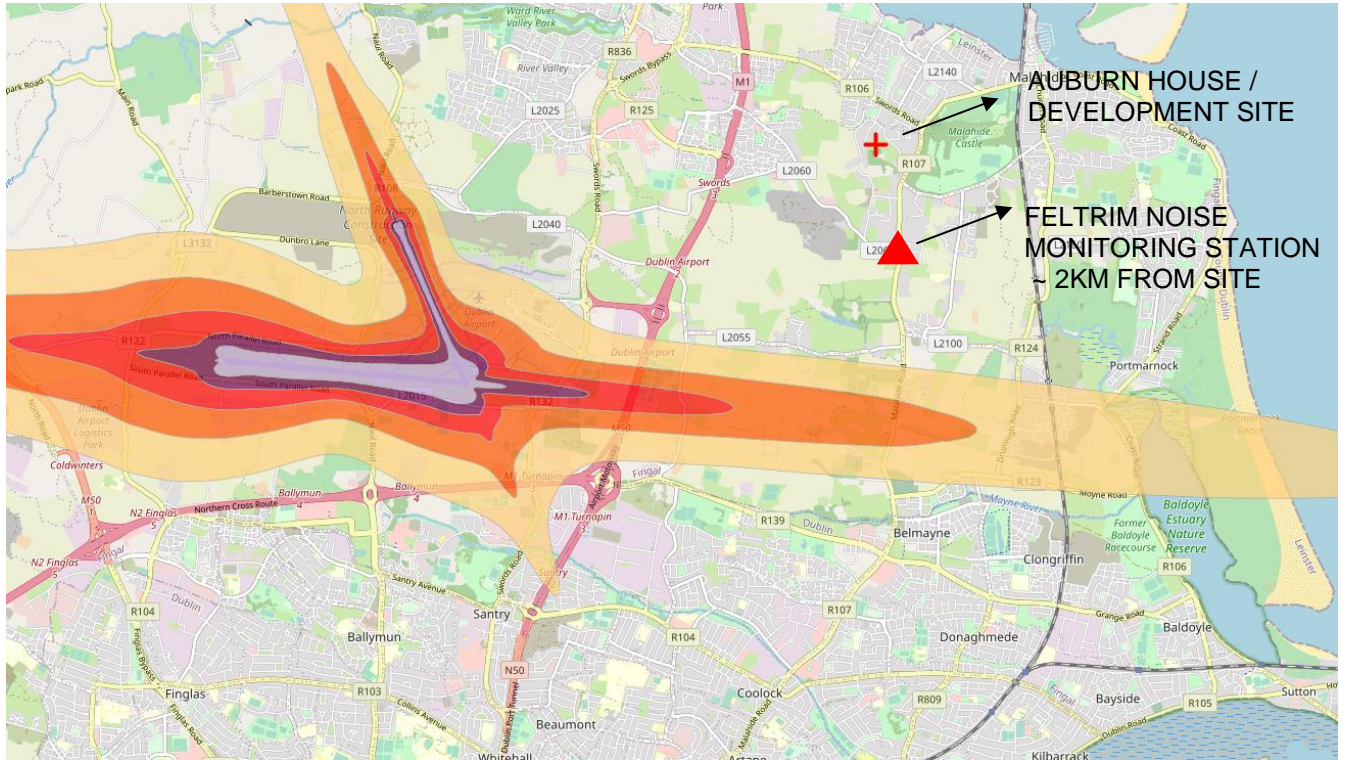


Image 5.1 EPA airport noise map – Lnight Night time 23.00 – 7.00 noise map

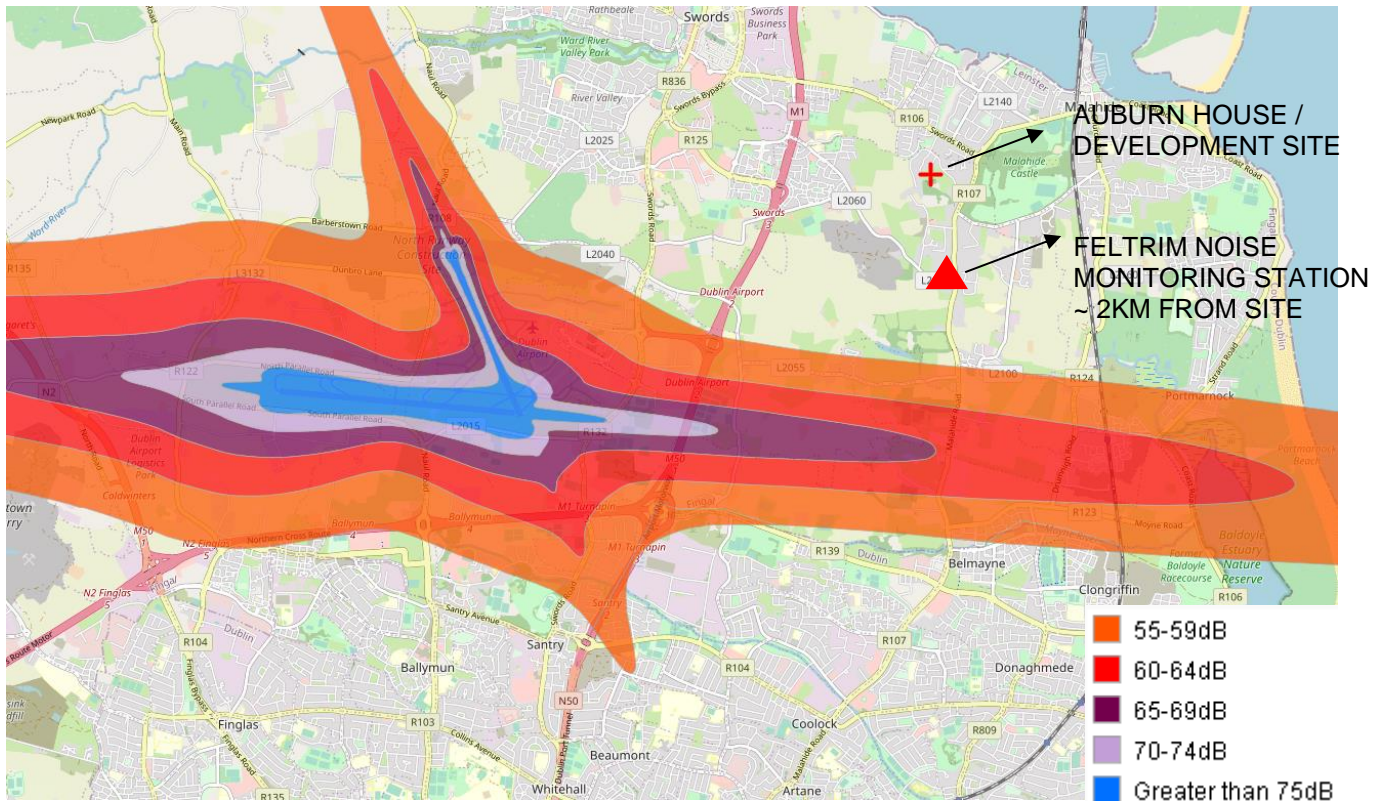


Image 5.2 EPA airport noise map – Lden Day time 7.00 – 23.00 noise map



## 5.2 Airport noise monitoring service

Dublin Airport have recently installed a noise monitoring system to ensure minimum disruption to the local community. This system is comprised of a number of fixed monitoring locations. Two monitoring stations are targeted specially for local communities, these include Feltrim station monitoring and Bishopswood station monitoring. In relation to Auburn House development site, Feltrim is located the nearest, approximately 2km from the new proposed development site.

## 5.3 Noise monitoring station Feltrim results

DAA publish half yearly reports on monitoring stations, the years 2017-2020 is available for public information. Summary of Feltrim noise monitoring data is presented in table 5.1 showing the different noise events types, namely the percentage of noise in either, weather, human activity of aircraft related events. The impact of covid-19 lockdown can be seen in the data for the year 2020 with a significant drop in aircraft noise recordings. Depending on the season, weather events have a significant input also.

Month / Year	Noise event types		
	Aircraft % *	Normal human activity %	Weather %
07-12 / 2017	22.0	32.6	45.3
01-06 / 2018	25.6	18.3	56.1
07-12 / 2018	31.3	40.1	28.6
01-06 / 2019	45.8	38.4	15.8
07-12 / 2019	44.9	42.1	13.0
01-06 / 2020	15.2	64.4	20.4
07-12 / 2020	11.3	71.7	17.0

Table 5.1

\*These are all uncorrelated aircraft noise events, since Feltrim is not directly overflown (Correlated aircraft noise events are coupled with a specific arriving or departing aircraft overflying the noise monitoring terminal, while uncorrelated aircraft noise events are not). Table 5.2 summarize the average measured noise levels at Feltrim, (Daytime noise level  $L_{Aeq,16h}$  and Night-time noise level  $L_{Aeq,8h}$  ).

Month / Year	Daytime noise level $L_{Aeq,16h}$ (dB)		Night-time noise level $L_{Aeq,8h}$ (dB)	
	Total	Aircraft	Total	Aircraft
07-12 / 2017	55.4	44.3	53.0	35.6
01-06 / 2018	57.2	46.9	54.2	36.7
07-12 / 2018	55.3	43.8	51.0	33.7
01-06 / 2019	56.2	46.0	53.1	39.0
07-12 / 2019	55.7	45.0	50.8	36.7
01-06 / 2020	57.0	43.2	53.3	35.3
07-12 / 2020	54.8	38.1	50.8	33.3

Table 5.2

## 5.4 Noise prediction at the Auburn House development site

For the noise level prediction as a result of the flight path the facades of the dwellings in the new proposed development are assumed to be at the same receiver distance from the flight path using the closest distance from the development to the flight path. Noise level prediction calculations are calculated using " $L_r = L_w \cdot 20\log_{10} \cdot m - 10.9$ " where m = the distance to the receiver. Section 5.5 details the noise prediction calculation data.

## 5.5 Calculated noise levels at the facades

From table 5.2 below we note that the average weighted back ground noise levels including the air craft noise levels from the Feltrim noise measurement station and EPA noise maps for both the day time and night time periods resulted in day time noise levels of 47.9 to 50.6 dB and night time noise levels of between 43.8 to 48.2 dB.

Average back ground noise level	7.00-23.00 $L_{den} / L_{AEQ16}$	23.00-7.00 $L_{night} / L_{AEQ8}$	
Auburn House site	47.9 – 50.6 dB	43.8 – 47.2 dB	

Table 5.3



## 5.6 New development noise impact assessment criterion

To determine any possible actions from the predicted day time (47.9 and 50.6dB) noise levels and predicted night time (43.8 to 48.2 dB) noise levels at the facades of the relevant blocks in the new development we compare these with the noise impact assessment criterion table 4.1 and note the day time noise levels to fall in the “A” category where no consideration to noise levels is required and night time noise levels marginally in the “B” category where the noise impact would need some consideration.

Back ground 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.
Category “A”	<= 55 dB	<= 45 dB	Noise impact need not to be considered
Category “B”	55 – 66 dB	45 – 59 dB	Noise impact need to be considered

Table 5.4

## 5.7 Noise impact consideration

The new proposed development will be of modern construction and as part of the new building regulations and in particular Part L, requirement will need to have a high level airtightness standard giving the construction a relative high noise reduction capability. For this report we have applied conservative “standard” noise reduction capabilities.

	Solid external walls	Glazing	Façade average	Comments
Noise reduction capability standard	> 50 dB	35 dB	35.5 dB	Applied for assessment

Table 5.5

## 5.8 Predicted noise levels in habitable rooms

The resultant internal ambient room noise levels shown in the table below are the results of the Feltrim noise measurement station maximum noise levels less the average façade noise reduction capability (35.5dB) of the facades (table 5.5) of the new proposed development.

Calculated internal room noise level after façade noise reduction from back ground noise.

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>
Closets façade to flight path	15.1 dB	11.7 < dB

Table 5.6

## 5.9 Conclusion

Comparing the calculated internal room noise levels ranging from 15.1 dB(A) during the day time (7.00-23.00) period and 11.7 during the night time (23.00-7.00) period shown in table 5.6 with the WHO/CIBSE/BS8233 recommended maximum habitable room noise level shown in table (5.7) below we conclude that the resultants noise levels are below the “Very good / Country” levels and we deem this to be satisfactory and within the recommendations of the relevant standards and guides.

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
Bed room	25	30	35	40
Living room	30	35	40	45

Table 5.7

## 5.10 Recommendations and / or mitigation measures

No mitigation measures anticipated but just to ensure that the above internal room “Very good” ambient noise level standards are met by the facades to have a noise reduction capability of >=35dB and any openings i.e. ventilation grills, should have a noise reduction capability of >=37dB.