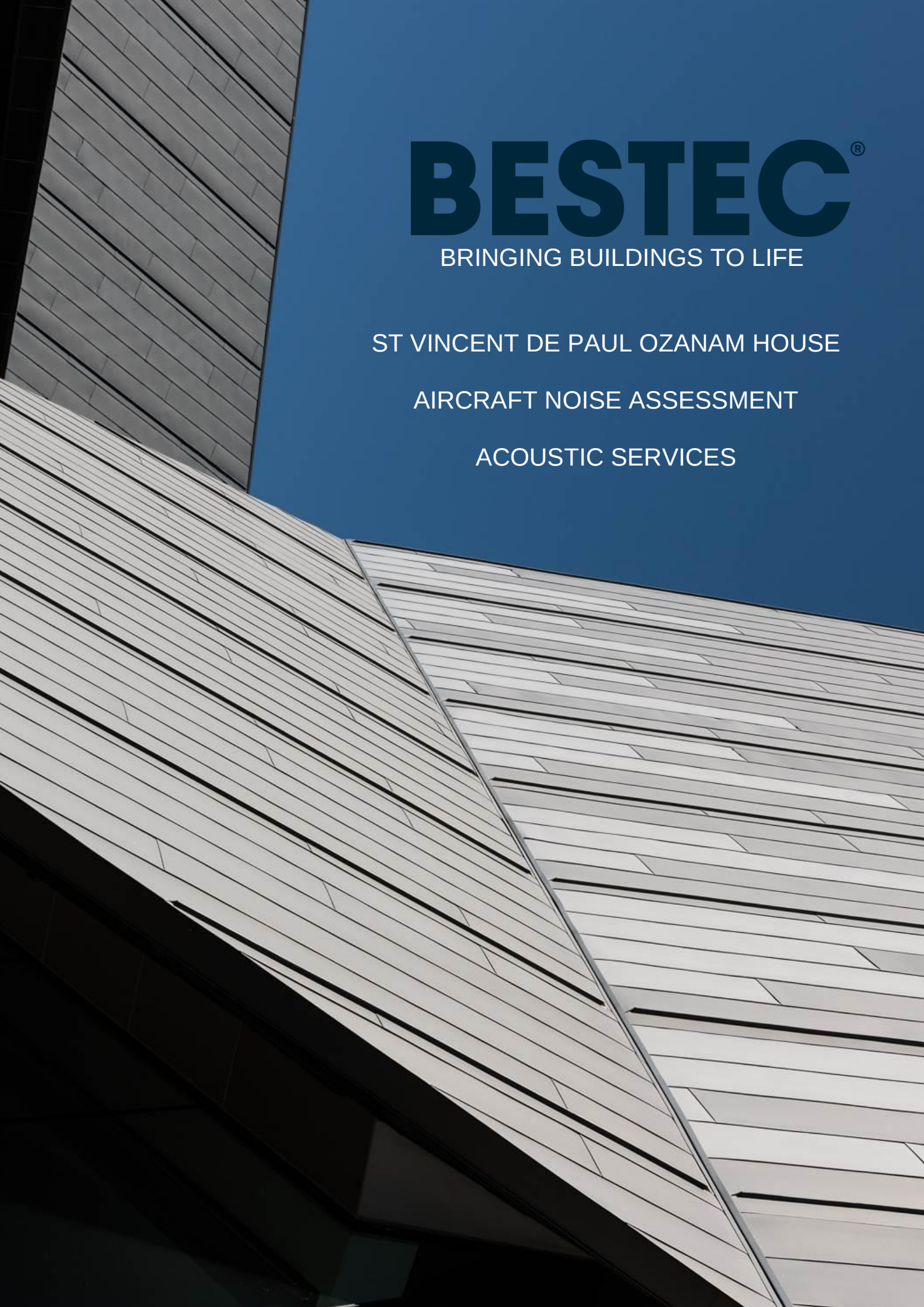




BESTEC[®]

BRINGING BUILDINGS TO LIFE

ST VINCENT DE PAUL OZANAM HOUSE

AIRCRAFT NOISE ASSESSMENT

ACOUSTIC SERVICES

LYH:OZH
57871/6/1
04 September 2024

Louw Group
Tenancy 25, 48 Marina Boulevard
LARRAKEYAH NT 0820

Attention: Ms L Piggott

Dear Madam

**ST VINCENT DE PAUL OZANAM HOUSE – AIRCRAFT NOISE ASSESSMENT
ACOUSTIC SERVICES**

As requested, we enclose a copy of our design report on the Acoustic Services for the above project.

We trust that the report provides sufficient information for your immediate purpose, and we would be most pleased to further discuss any aspect upon your request.

Yours faithfully
BESTEC PTY LTD

A handwritten signature in grey ink, appearing to read 'Louis' with a stylized flourish at the end.

**WANG YUEN HUI (Louis)
ACOUSTIC SERVICES ENGINEER**

Encl

REPORT ISSUE REGISTER

REVISION	DATE	REVISION DESCRIPTION
00	17.05.2024	Initial Issue
01	06.08.2024	Revised Issue
02	04.09.2024	Revised Issue

CONTENTS

Introduction 1

Executive Summary 1

Acoustic Analysis..... 2

References.....2

Proposed Development2

Design Criteria.....2

Assessment and Recommendations..... 3

Building Envelope3

Appendix A 4

Introduction

BESTEC Pty Ltd has been engaged to assess the noise impact on proposed development for St Vincent De Paul Ozanam House resulting from commercial aircrafts using Darwin International Airport, and to provide recommendations for acoustic modifications where required in order to achieve the criteria for aircraft noise intrusion set by AS 2021:2015 "Acoustics – Aircraft noise intrusion – Building siting and construction." This document presents the proposed acoustic design criteria, the results of our assessment and recommendations to achieve the selected design criteria.

Executive Summary

In summary:

- The incident aircraft noise levels resulting from BOEING 737-800 have been calculated using the AS 2021:2015 methodology.
- The architectural drawings have been reviewed and the internal noise levels have been calculated taking into account the construction and extent of the building envelope elements.
- The calculated internal noise levels for each space have been assessed against the criteria for aircraft noise set by AS 2021:2015.

Based on the results of our assessment, we note that units are constructed in accordance with the architectural drawings, and therefore complies with the criteria set by AS 2021:2015 and therefore, no further acoustic treatment is required.

Acoustic Analysis References

The following documents have been referenced within the preparation of this report:

- [1] Architectural drawings provided by Hawkins & Clements, dated February 2024.
- [2] AS 2021:2015 "Acoustics – Aircraft noise intrusion – Building Siting and Construction"
- [3] For Construction drawings provided by Hawkins & Clements, dated August 2024.

Proposed Development

The proposed development is to be constructed on 115 Dick Ward Drive Coconut Grove Northern Territory. The location is illustrated in Figure 1.



Figure 1: Captured from Google Earth, showing the location of the proposed development

Design Criteria

AS 2021-2015 sets the criteria for aircraft noise intrusion in terms of A-weighted maximum sound pressure level (L_{Amax}) within differing building interiors depending on their use. The proposed development is a general light industrial tenancy and therefore, the following criteria for aircraft noise intrusion are relevant:

- Commercial building, offices, and shops
 - Private offices, Conference rooms: 55dB(A)
 - Open plan office: 65dB(A)
 - Shop, supermarkets, showrooms: 75dB(A)

The standard does not stipulate aircraft noise for laundry and social work; however, we consider that the aircraft noise for service area and social activities could be deemed applicable to laundry and social work.

Therefore, the noise levels during a typical aircraft flyover should not exceed the following criteria:

- Social activities: 70dB(A)
- Service area: 75dB(A)

The noise levels during a typical commercial aircraft flyover should not exceed these criteria.

Assessment and Recommendations

We calculated the incident aircraft noise levels at 115 Dick Ward Drive Coconut Grove Northern Territory, taking into account the distances between the centre of the runway to the block of land, as well as the relative distances to the respective ends of the Darwin International Airport runway as per the methodology outlined in AS 2021:2015 [2]. The calculated incident A-weighted maximum sound pressure level (L_{Amax}) have been based on Boeing 737 – 800 (the predominant aircraft using Darwin Airport) as follows:

- Arrival: 68dB(A)
- Departure: 80dB(A)

Based on the above results, L_{Amax} 80dB(A) has been used in our assessments.

Building Envelope

Based on the architectural drawings [1] and email correspondence, we note the following construction of the building elements:

- Façade – 75mm Bondor Panel
- Roof – 0.42mm Roof Cladding Custom Orb and 75mm Roof Truss
- Ceiling – 75mm Roof Truss, 25mm Ceiling Batten Screw and 13mm Plasterboard
- Glazing – 6mm glass in aluminium frame.
- Door – Solid core and aluminium framed doors

Note: Any operable glazing should be fitted with appropriate compressible acoustic seals (Raven or Schlegel ranges).

Based on the architectural drawings and the design aircraft noise levels, we assessed the aircraft noise transmission through each noise transmission path including the façade, roof/ceiling and glazing and the calculated noise levels are summarised in Table 1.

Space	Transmission Path	Maximum Internal Noise Level, dB(A)	Criteria AS2021:2015 dB(A)	Compliance
Social Work	Facade	65	70	Yes
	Roof/Ceiling	56		
	Doors	46		
	Glazing	48		
Laundry	Facade	61	75	Yes
	Roof/Ceiling	56		
	Doors	45		
Reception	Facade	65	65	Yes
	Roof/Ceiling	56		
	Doors	43		
	Glazing	45		

Table 1: Calculated aircraft noise levels (L_{Amax}) from the assessment

Based on the results of our assessment, we note that the criteria set by AS 2021:2015 are achieved and therefore, no further acoustic treatment is required.

Please note for construction architectural drawings have been reviewed to confirm the building elements, the aircraft noise criterion will be achieved with the doors/windows closed and provided no openings and gaps.

Please note that any gaps or openings around the façade or glazing would degrade the acoustic performance of the structure by creating noise flanking paths. Therefore, it is critical all interfaces and junctions to be inspected with any gaps blocked off and sealed with appropriate acoustic grade sealant.

Appropriate acoustic sealant caulking products include:

- Bostik Firemastic.
- Bostik Seal-n-flex 2637.
- Pyropanel Multiflex.
- Boral Fyreflex.

-
- Dow-Corning 790 Silicone.
 - Dow-Corning 795 Silicone.
 - Sika Sikaflex-11 FC.
 - Fosroc Flamex 3.

Appendix A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A) Also referred to as dBA. A unit of measurement, decibels (A), of sound pressure level which has its frequency characteristics modified by a filter ("A-weighted") so as to more closely approximate human ear response at a loudness level of 40 phons. The table below outlines the subjective rating of different sound pressure levels.

Noise Level (dBA)	Subjective Rating
25-30	Barely audible and very unobtrusive.
30-35	Audible but very unobtrusive.
35-40	Audible but unobtrusive.
40-45	Moderate but unobtrusive.
45-50	Unobtrusive with low levels of surrounding activity.
50-55	Unobtrusive with high levels of surrounding activity.

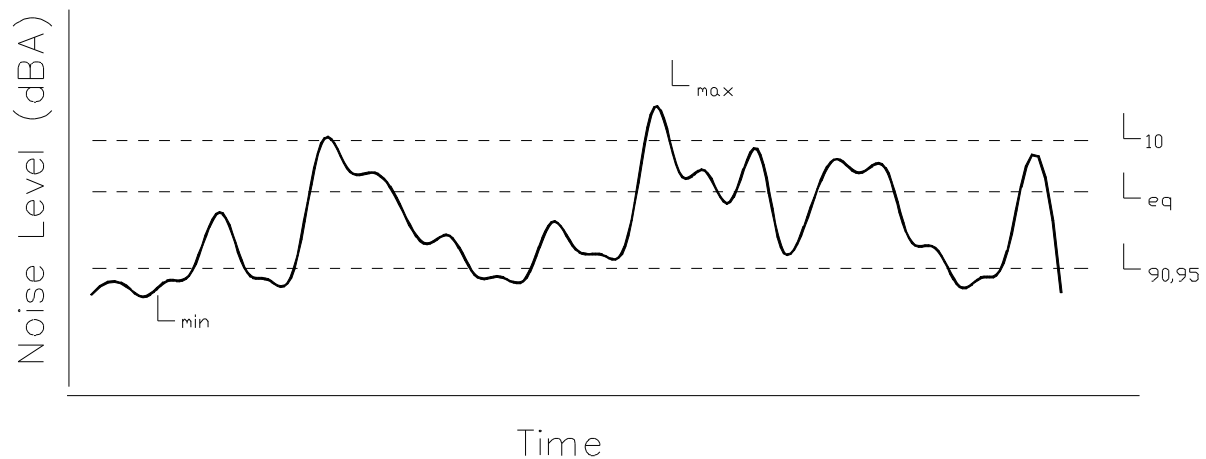
L₁ The noise level which is equaled or exceeded for 1% of the measurement period. L₁ is an indicator of the impulse noise level, and is used in Australia as the descriptor for intrusive noise (usually in dBA).

L₁₀ The noise level which is equaled or exceeded for 10% of the measurement period. L₁₀ is an indicator of the mean maximum noise level, and is used in Australia as the descriptor for intrusive noise (usually in dBA).

L₉₀, L₉₅ The noise level which is equaled or exceeded for 90% of the measurement period. L₉₀ or L₉₅ is an indicator of the mean minimum noise level, and is used in Australia as the descriptor for background or ambient noise (usually in dBA).

L_{eq} The equivalent continuous noise level for the measurement period. L_{eq} is an indicator of the average noise level (usually in dBA).

L_{max} The maximum noise level for the measurement period (usually in dBA).



Note: The subjective reaction or response to changes in noise levels can be summarised as follows: A 3dBA increase in sound pressure level is required for the average human ear to notice a change; a 5dBA increase is quite noticeable and a 10dBA increase is typically perceived as a doubling in loudness.

STC/R_w Sound Transmission Class or Weighted Sound Reduction Index. Provides a single number rating (from the sound transmission loss or sound reduction index for each frequency band) of the sound insulation performance of a partition. The higher the value, the better the performance of the partition. The subjective impression of different ratings is shown in the table below.

Type of noise source	STC/R _w Rating				
	40	45	50	55	60
Normal Speech	Audible	Just Audible	Not Audible		
Raised speech	Clearly Audible	Audible	Just Audible	Not Audible	
Shouting	Clearly Audible	Clearly Audible	Audible	Just Audible	Not Audible
Small television/small entertainment system	Clearly Audible	Clearly Audible	Audible	Just Audible	Not Audible
Large television/large hi-fi music system	Clearly Audible	Clearly Audible	Clearly Audible	Audible	Just Audible
DVD with surround sound	Clearly Audible	Clearly Audible	Clearly Audible	Audible	Audible
Digital television with surround sound	Clearly Audible	Clearly Audible	Clearly Audible	Audible	Audible

FSTC/R_w' The equivalent of STC/R_w, unit for sound insulation performance of a building element measured in the field.

C_i, C_{tr} The ratings (R_w, D_{nTW}, L_{nTW}) are weighted in accordance to a spectrum suited to speech. This term modifies the overall rating to account for noise with different spectra, such as traffic (C_{tr}) or footfalls (C_i). The ratings may be written as R_w+C_{tr}, or D_{nTW}/L_{nTW}+C_i.

NNIC/D_{nTW} Normalised Noise Isolation Class, or Weighted Standardised Sound Level Difference. Provides a single number rating of the sound level difference between two spaces, and incorporates the effects of flanking noise between two spaces. This rating is generally accepted to be about 5 points less than the STC/R_w rating.

IIC/L_{nw} Impact Insulation Class, or Weighted Normalised Impact Sound Level. L_{nw}=110-IIC. The higher the IIC rating, or the lower the L_{nw} rating the better the performance of the building element at insulating impact noise. The table below gives the subjective impression of different ratings:

IIC	L _{nw}	Subjective Rating
40	70	Clearly Audible
45	65	Clearly Audible
50	60	Audible
55	55	Audible
60	50	Just Audible
65	45	Inaudible

FIIC/L_{nTW}' The equivalent of IIC/L_{nw}, but the performance is for the building element measured in the field.