

File Ref: AC18108 – 02 – R1

Level 3, 518 Colombo Street
Christchurch 8011
PO Box 549
Christchurch 8140

Ph 03 377 8952
www.aeservices.co.nz
office@aeservices.co.nz

18 May 2018

Nick Geddes
Clark Fortune McDonald & Associates
PO Box 553
QUEENSTOWN

Email: ngeddes@cfma.co.nz

Dear Nick,

**Re: Homestead Bay Trustees Ltd Subdivision, Jack Point, Queenstown
55 dBA L_{dn} aircraft noise contour**

As requested, we have undertaken a site visit and measurements with regard to the proposed Homestead Bay Trustees Ltd Subdivision at Jack Point, in Queenstown to determine the location of the 55 dB L_{dn} aircraft noise contour.

1.0 Background

As part of the Queenstown Lakes District Council's (QLDC) Proposed District Plan, the Jardine Family Trust and Remarkables Station Limited submitted to the QLDC with regard to changes to Chapter 41 for rezoning part of the land at Homestead Bay from a Rural zone to Jacks Point zone. This rezoning includes an extension of the proposed Residential zone outlined in the current Jacks Point Structure Plan.

Ms Jones on behalf of the Queenstown Lakes District Council produced a Section 42A report / Statement of Evidence on the submission for Hearing Stream 13 – *Queenstown Mapping Annotations and Rezoning Requests*. Ms Jones relied upon acoustics evidence produced by Dr Stephen Chiles.

Dr Chiles provided a statement of evidence which included a discussion of the rezoning and residential extension proposal at Homestead Bay. Dr Chiles was concerned that reverse sensitivity effects may arise from people moving to the area being adversely affected by the current N-Zone skydive operation at the adjacent airstrip. Dr Chiles proposed that no residential dwellings be constructed within the 55 dBA L_{dn} noise contour associated with the airstrip. Ms Jones agreed.

At that point no work had been undertaken to determine the location of the 55 dB L_{dn} contour. Therefore Dr Chiles and Ms Jones recommended that noise monitoring be undertaken on the Homestead Bay site to determine where the 55 dBA L_{dn} contour lies to ensure that no residential houses are constructed in this area. Dr Chiles estimated that the contour would be between 100 and 200 metres from the side of the runway and up to 600 metres away from the idling pad of the aircraft.

We have been engaged by Homestead Bay Trustees Ltd to undertake measurements relating to the typical operation of the airstrip and to calculate the extent of the 55 dBA L_{dn} contour within the Homestead Bay subdivision area.

2.0 Site measurements and observations

2.1 Noise measurements

George van Hout from Acoustic Engineering Services visited the site between 0900 and 1500 hours on the 3rd of May 2018 (a Thursday). During this time, N-Zone Skydiving aircraft were flying continuously from the airstrip.

Details of the measurements completed in general accordance with NZS 6801:2008 are as follows:

Date and time:	0900 to 1500 hours on the 3 rd of May 2018
Personnel:	George van Hout, Acoustic Engineering Services
Weather:	Clear, light north to northwest wind, Temperature range from 9°C to 14°C
Instrumentation:	Brüel & Kjær Type 2250 Class 1 Sound Analyser (Serial Number 3008199, last calibrated 22 March 2017) Brüel & Kjær 4231 Acoustic calibrator (Serial Number 3011404, last calibrated 28 March 2018)
Field calibration:	The analyser was calibrated before measurements, and the calibration checked after measurements. No significant change was noted (<0.1 dB).
Settings:	A weighting (dBA), fast response.

Three measurement positions were considered on the proposed subdivision to the south of the airstrip and two measurement positions were considered to the north of the airstrip. A number of measurements were undertaken in each position for take-off, landings, and idling noise. We note that while idling noise was distinguishable over other ambient noise, other sources were also audible and affected the measurements undertaken.

The Sound Exposure Levels (SEL) of the two Cessna Supervan 900 used at the airstrip during landing procedures were measured to be between 80 dBA and 85 dBA at 215 metres. The SEL during take-off procedures were measured between 78 dBA and 81 dBA at 215 metres. Measured noise emissions from the plane idling when it was facing the measurement location and ambient noise was low was measured to be 45 dB $L_{Aeq}(30 \text{ seconds})$ at 900 metres. Idling noise could not be measured easily in other locations due to construction works, heavy vehicles on Maori Jack Road, traffic on adjacent roading network, other environmental noise (birds, dogs, wind in trees), and people talking.

2.2 Site observations

Observations from our site measurements were:

- On average, aircraft took approximately 40 seconds to take-off from increasing power at the end of the runway to the aircraft passing behind Jacks Point Hill.
- On average, the aircraft took approximately 40 seconds to land, from the point where it emerges from behind Jacks Point Hill to finishing braking and returning to the sealed aircraft pad.
- The highest noise associated with take-off or landings was when the plane was approaching the measurement position. Once the plane had passed the measurement position, noise levels decreased significantly.
- During our site visit, the plane idled with its engines on for typically between 8 and 13 minutes while people were unloading / loading when flights were running constantly. There were some occasions when one or both of the planes were shut off completely.
- Depending on the height which the plane climbed to, on some occasions one plane would take-off just before one plane would land. When this occurred, the SEL was measured at 83 dBA SEL at 240 metres.

- When planes were idling on site, they were located on the concrete pad outside the hangar, facing between straight down the runway or slightly to the south of the runway centreline. This is expected to result in a worst-case scenario for idling noise on the Homestead Bay Trustees site. When leaving to take-off, the plane turned towards the north and moved to the centreline of the runway then turned back, facing straight down the runway before accelerating to take-off.
- No aircraft used the proposed 'Arrival Path C' shown in Dr Chiles' evidence for Hearing Stream 13 during the time which we were on site. When one aircraft landed and one took-off at the same time, the landing plane flew over Jacks Point Hill rather than over the golf course. This required two tight turns before landing, and generally resulted in a much steeper landing profile than when a landing procedure was over the golf course.
- During events when one plane was shut down and one was in the air (i.e. no idling noise from the airstrip), ambient noise levels were measured between 37 dB $L_{Aeq(1 \text{ min})}$ to 42 dB $L_{Aeq(1 \text{ min})}$. Noise during these times included construction noise, traffic on roads, general residential noise (people talking), aircraft noise (both from the skydive operation and general planes and helicopters in the area), and other environmental noise (birds, dogs barking, wind in the trees). The maximum noise level when planes took off or landed was therefore more than 20 dB over the ambient noise level.

3.0 Location of the 55 dB L_{dn} noise contour

From our measurements of aircraft taking off, landing, and idling on site, we have deduced the location of the 55 dBA L_{dn} over the Homestead Bay Trustees Ltd proposed subdivision.

We understand that a maximum of 35 flights can occur during a single day. The operating times change between seasons, operating between 0700 and 1500 hours during the winter and 0600 to 1600 hours during the summer. During the summer, flights sometimes occur before 0700 hours, which is within the night time period (defined as between 2200 to 0700 hours the following day in NZS 6805:1992). A 10 dB penalty is applied to flights before 0700 hours, to take into account increased annoyance during the night time period.

We have modelled the 55 dB L_{dn} contour based on a peak day where four of the 35 flights occur during the night time hours. We note that NZS 6805:1992 discusses the three month average L_{dn} and previous analysis of the N-Zone operation has discussed a 1-week average L_{dn} level. Our approach is therefore conservative.

The resulting calculated location of the 55 dB L_{dn} noise contour in the vicinity of the Homestead Bay Trustees site is shown in figure 3.1 below.



Figure 3.1 – Location of the 55 dB L_{dn} aircraft noise contour on the Homestead Bay Trustees Ltd subdivision

This contour is located approximately 240 metres from the centreline of the runway, which is slightly further than the 100 to 200 metres estimated by Dr Chiles.

With regard to the idling noise measured on the Homestead Bay Trustees site, we note that while idling was audible on site, it was not the dominant noise source. Measurements when idling noise was present were often contaminated by other sources. Detailed analysis of our measurement results suggest that idling noise does not influence the 55 dB L_{dn} noise contour in the vicinity of the site, or approach 50 dB L_{Aeq} while idling is underway.

Kind Regards,

A handwritten signature in black ink, appearing to read 'G van Hout'.

George van Hout
BSc. ME(Mech). MASNZ.
Acoustic Engineer

Acoustic Engineering Services