



**HEGLEY ACOUSTIC
CONSULTANTS**

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Dear Karen

QUEENSTOWN AIRPORT COMPANY PRIVATE PLAN CHANGE

As requested I have undertaken a peer review of the report prepared by Marshall Day Acoustics for the Queenstown Airport Company Private Plan Change, which seeks to amend the existing airport airnoise boundaries and add further noise controls. J P Clarke has undertaken a peer review of the INM modeling so I have not addressed those issues in my review.

As a general comment it is agreed that the airport needs to cater for its planned operations and if this means moving the noise contours to achieve the goals of the airport then that is accepted. This is acknowledged by *NZS 6805:1992 Airport Noise Management and Land Use Planning* and providing the controls are reasonable for the residents and the airport there is no good reason to limit the operation of the airport.

Rather than address all of the information provided I will simply comment on points that I feel should be considered further to assist with the decision making.

Section 4.7 of the Marshall Day Acoustics report acknowledges the difference between the requirements of NZS 6805:1992 Airport Noise Management and Land Use Planning and NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas. NZS6805 adopts an outer control boundary of 55dBA L_{dn} compared to 50dBA L_{dn} adopted by NZS6807.

The lower level for helicopters has been adopted to take into account the special audible characteristics of helicopter noise. As set out in the Marshall Day Acoustics report it would lead to unnecessary difficulties to combine the different controls. Further, where there is significant noise from fixed wing aircraft, the effects of any special audible characteristics from helicopters would be less than if there were to be a dedicated heliport. It is agreed that adopting the requirements of NZS6805 for fixed wing aircraft for both fixed wing and rotary aircraft is reasonable and acceptable. This same method of analysis has been adopted at other airports around the country.

In 5.2 it has been suggested that a sound insulation boundary (57dBA L_{dn}) be adopted. This has been based on the typical sound reduction into a house with windows ajar showing that an acceptable noise environment inside the house is achieved at 57dBA. This is agreed with and saves unnecessary cost for the developer.

Section 5.4 develops an argument that adopting an SEL of 95 is a reasonable limit for aircraft exposure at night time. This level has been adopted at other small airports where the 55dBA and 65dBA L_{dn} contours are relatively close to the runway so the occasional night time flight is not provided for. The basic argument here is that occasional night time events are being introduced and the 65dBA L_{dn} contour does not reflect the potential night time noise intrusion.

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Inspection of Figure 9 in the Marshall Day Acoustics report shows there is, in fact, little practical difference for the properties affected between the 65dBA L_{dn} contour and the 95dBA SEL contour. The sound reduction required at the 65dBA L_{dn} contour is $65 - 40 = 25$ dBA and at the 96dBA SEL contour the reduction is $95 - 70 = 25$ dBA.

If we adopt the values used by Marshall Day Acoustics there is little advantage at Queenstown Airport to include both L_{dn} and SEL controls. However, the SEL contour does not do any harm so it could be retained if wished. One reason to retain the SEL control is that it has been adopted as a trigger although this could easily be achieved using a similar approach based on night flights. It has not been made clear what the SEL is at the closest house in Frankton. From the contours it appears the SEL could be 100 – 105dBA so the sound reduction to be achieved would be at least 30 – 35dBA. A reduction of 30dBA is toward the upper practicable limit of any façade sound reduction that could be achieved so by using the Marshall Day Acoustics values for some houses it may not be practical to achieve the required sound reductions. This should be clarified.

The Marshall Day Acoustics report has adopted 65 – 70dBA SEL (a single figure should be adopted and in this case it has been assumed 70dBA is sought) as the appropriate internal sound level as taken from FICAN 1997 (Figure 6.2). I agree with these levels if the FICAN data is adopted. However, if the WHO guidelines are considered, a different result is obtained. The WHO guidelines, Section 3.4 Sleep Disturbance, states:

For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10 - 15 times per night (Vallet & Vernet 1991), and most studies show an increase in the percentage of awakenings at SEL values of 55 - 60dBA (Passchier-Vermeer 1993; Finegold et al. 1994; Pearsons et al. 1995). For intermittent events that approximate aircraft noise, with an effective duration of 10 - 30 s, SEL values of 55 - 60dBA correspond to a L_{Amax} value of 45dB.

Clarification should be sought on the 10dBA difference in the conclusions reached between these two publications, as this could make a significant difference to the recommendations and practicality of complying with the acoustic design.

The report states “that the potential sleep disturbance effects from the proposed night time aircraft arrivals, is considered reasonable based on the low number of movements (11 per week), the timing of the events (ie before midnight and after 6:00am) and the provision of sound insulation treatment for the most affected dwellings.” This is agreed with. However, the proposed conditions do not appear to control the number of night time events other than with the SEL and L_{dn} criteria. It would seem it is practical to increase the number of night time events and comply with both the SEL and L_{dn} controls. If the number of events is significant, in determining the use of SEL 95, and it would appear this is the case otherwise it would not have been addressed, clarification should be sought as to whether the numbers of events should also be included in the conditions to maintain credibility with the proposed controls.

In Section 7.0 it is recommended that inside the ANB (65dBA contour) new noise sensitive uses should be prohibited. This is generally in keeping with the requirements of NZS6805 and supported. However, the question this raises is where there is a vacant section within the ANB does this mean the land cannot be used and if this is the case it would appear the land has been reduced to little practical value as far as the owner is concerned. Does the airport propose to purchase such properties due to this limitation imposed on the land by the airport?

This section also addresses the use of sound insulation and other forms of aircraft noise control adopted around the country. Some time has passed since the original noise controls were developed for Queenstown Airport. The approach that has evolved is that for existing houses outside of the ANB a percentage of the cost to upgrade the house to an appropriate indoors sound level is paid by the noise maker (the airport). Comment on such an approach being adopted at Queenstown is sought and why this should not be offered to the existing residents who are experiencing noise levels of greater than, say, 60dBA L_{dn} . This could make a difference for the

existing residents where night time flights are now proposed, as these flights will alter the overall noise environment.

In Section 7.2 the last paragraph recommends acoustic treatment for given houses prior to any night time jet arrivals between 10:00pm – midnight. It is not clear why the 6:00am – 7:00am period has not been included. This should be clarified. Further, it is not clear why only arrivals are included. It is understood that in Section 4.6 only arrivals are expected but the proposed conditions do not exclude departures although no mention is made of the 6:00am – 7:00am period. Normally, the early morning flights would be expected to be departures. This should be clarified.

In Section 8.2 the issue of engine testing has been raised with specific noise control proposed. It is agreed some relaxation would be reasonable although any relaxation would need further clarification. Guidance on the number of such events and the duration over the last few years would assist.

At the moment it is difficult to support such high noise levels for engine testing for potentially every night of the year. This is best addressed by examples. The issue is night time noise so the comments have been restricted to the night time.

A level of 45dBA L_{eq} (9 hours) at night will allow noise levels of 61dBA L_{eq} for 15 minutes every night at any time of the night. For 18 occasions each year this level would be increased to 76dBA L_{eq} for 15 minutes, or in terms of the SEL values adopted elsewhere in the report, an SEL 105dBA.

Such levels would, without question, cause a significant disturbance for the residents.

It is appreciated that the above levels quoted may not be the level that would be generated. However, this is an example of what the condition as worded is seeking. In fact, if the time is reduced to 5 minutes the noise level could reach 65dBA L_{eq} each night and 80dBA L_{eq} for 18 times a year. If longer time periods are assumed, the level could be at 54dBA L_{eq} for 1 hour each night plus 69dBA L_{eq} for 1 hour for 18 times a year. Such high levels at any time of the night for potentially so many nights would require more robust support if these high levels are to be considered further. Further comment is considered necessary before considering accepting any such relaxation of the noise levels.

The Table in Appendix F sets out some acceptable façade construction options. It is agreed that tables can be helpful for anyone undertaking new work and such generalised controls should be conservative. However, it is difficult to understand why the design for an external cladding of brick or concrete block requires the same 2 x 9mm gypsum or plasterboard as 20mm timber cladding. The brick (or blocks) plus 1 x 9mm gypsum exceeds the sound reduction of 20mm timber plus 2 x 9mm gypsum. This is an unnecessary cost for developers and should be reviewed along with some of the other extreme design unless there is a good reason.

Ventilation is not my field of expertise. My only comment is that compliance with Section G4 of the Building Code is normally considered reasonable and it may be appropriate to seek advice from a mechanical engineer.

Depending on the response to the above points it may be necessary to update the proposed controls in AF1.2. For this reason, no comments are made at this point on these proposed noise controls.

Should you have any questions regarding the above please do not hesitate to contact me.

Yours faithfully
Hegley Acoustic Consultants



Nevil Hegley