

**BEFORE THE HEARINGS PANEL
FOR THE QUEENSTOWN LAKES PROPOSED DISTRICT PLAN**

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER Hearing Stream 07
- Designations

**STATEMENT OF EVIDENCE OF DR STEPHEN GORDON CHILES
ON BEHALF OF QUEENSTOWN LAKES DISTRICT COUNCIL
(REQUIRING AUTHORITY)**

ACOUSTICS ENGINEER

7 October 2016

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1. INTRODUCTION

- 1.1** My name is Dr Stephen Gordon Chiles.
- 1.2** I am an acoustics engineer and independent commissioner, self-employed by my company Chiles Ltd. I am a visiting academic at the University of Canterbury Acoustics Research Group.
- 1.3** I have a Doctorate of Philosophy in Acoustics from the University of Bath, and a Bachelor of Engineering in Electroacoustics from the University of Salford, UK. I am a Chartered Professional Engineer, Fellow of the UK Institute of Acoustics and Member of the Resource Management Law Association.
- 1.4** I have been practising in acoustics since 1996, as a research officer at the University of Bath, as an acoustics specialist at the NZ Transport Agency, and as a consultant for the international firms Arup, WSP, and URS and for the specialist firms Marshall Day Acoustics and Fleming & Barron. I have previously been responsible for acoustics assessments and design for numerous different activities including infrastructure, industrial, commercial, recreational and residential developments. I routinely work for central and local government, companies and individual residents.
- 1.5** With respect to aircraft noise issues, I have previously worked for the UK Royal Air Force, where I was involved in a wide range of airport environmental noise assessment and control. I was an independent commissioner, hearing plan changes and notices of requirement relating to aircraft noise at Queenstown and Wanaka Airports. I have also worked for a developer regarding potential noise issues from Omaka Airfield, and for the Queenstown Lakes District Council with respect to numerous helicopter landing areas and the skydiving operation at Jacks Point.
- 1.6** I am convenor of the New Zealand industry reference group for the international standards committee ISO TC43 (acoustics), which is responsible for approximately 200 published "ISO" standards relating to acoustics. I was Chair of the 2012 Standards New Zealand acoustics standards review group; Chair for the 2010 wind farm noise standard revision (NZS 6808); and a member for the 2008 general environmental noise standards revision (NZS 6801 and NZS 6802).

- 1.7 This is the fourth statement of evidence I have prepared on behalf of QLDC for Stage 1 of the PDP. My previous three statements have been prepared on behalf of QLDC as the regulatory authority for the: Rural Hearing¹ District Wide Hearing² and Residential Hearing³. I have now been engaged by QLDC in its role as the requiring authority to provide acoustics evidence in relation to aircraft noise issues associated with designations #29 and #239 in Chapter 37, for the Queenstown Events Centre (**QEC**) and Glenorchy Airstrip respectively.
- 1.8 With respect to this evidence, where I discuss designation #29 for the QEC, I declare that I was an independent commissioner for QLDC for plan change 35 (**PC35**) to the ODP relating to Queenstown Airport.
- 1.9 Although this is a Council hearing, I confirm that I have read the Code of Conduct for Expert Witnesses contained in Environment Court Practice Note 2014 and that I agree to comply with it. I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that this evidence is within my area of expertise, except where I state that I am relying on the evidence of another person.
- 1.10 The key documents that I have used, or referred to, in forming my view while preparing this brief of evidence are:
- (a) QLDC Operative District Plan (**ODP**) including Plan Change 35 (**PC35**) to the ODP;
 - (b) QLDC Proposed District Plan (**PDP**), in particular Chapter 37;
 - (c) Section 42A Hearing Report (**Section 42A report**), Chapter 37 – Designations (QLDC), dated 23 September 2016;
 - (d) Glenorchy Airstrip, Reserve Management Plan, dated July 2016;
 - (e) New Zealand Standard NZS 6805:1992 Airport noise management and land use planning (**NZS 6805**); and
 - (f) New Zealand Standard NZS 6807:1994 Noise management and land use planning for helicopter landing areas (**NZS 6807**).

¹ <http://www.qldc.govt.nz/assets/Uploads/Planning/District-Plan/Hearings-Page/Hearing-Stream-2/Section-42-A-Reports/Expert-Evidence/QLDC-02-Rural-Stephen-Chiles-Evidence.pdf>

² <http://www.qldc.govt.nz/assets/Uploads/Planning/District-Plan/Hearings-Page/Hearing-Stream-5/Section-42A-Reports-and-Council-Expert-Evidence/QLDC-05-District-Wide-Stephen-Gordon-Chiles-Evidence-.pdf>

³ <http://www.qldc.govt.nz/assets/Uploads/Planning/District-Plan/Hearings-Page/Hearing-Stream-6/Section-42A-Reports-and-Council-Expert-Evidence/Council-Expert-Evidence/QLDC-06-Residential-Stephen-Chiles-Evidence-28356410-v-1.pdf>

2. EXECUTIVE SUMMARY

2.1 The key findings from my evidence are that:

- (a) Aircraft operations at Queenstown Airport and Glenorchy Airstrip can result in daytime noise annoyance and disturbance for people in the surrounding areas. NZS 6805 and NZS 6807 recommend noise limits, which I consider provide a useful guide to potential noise effects, and are appropriate for Queenstown Airport. For Glenorchy Airstrip, the nature of aircraft operations is such that broader controls on aircraft numbers, flight paths and times of operations are appropriate to manage noise effects.
- (b) I consider that buildings containing noise sensitive activities in the Queenstown Events Centre designation (#29) should be designed to reduce aircraft sound to acceptable internal levels. While I consider that noise sensitive activities should preferably be located outside, rather than inside the Queenstown Airport noise contours, such as on the QEC site, I do not consider this to be an overriding factor if there are not equivalent sites available.
- (c) The Reserve Management Plan for Glenorchy Airstrip includes a range of measures that will control noise effects, including a licencing system that I understand will allow for efficient and practical enforcement of requirements. In terms of managing noise effects I do not consider there to be any need to duplicate these controls in conditions on designation #239, and I consider it preferable for noise controls for the airstrip to be located in a single place.

3. AIRCRAFT NOISE EFFECTS

- 3.1** With many sources of environmental noise, a key consideration is potential night-time sleep disturbance effects. However, Queenstown Airport has a curfew between 2200h and 0600h (D.1 condition 4) and Glenorchy Airstrip has a curfew between at least 2000h and 0800h (Reserve Management Plan). This curfew has also been proposed as a condition on the designation. Therefore, my evidence relates just to daytime noise effects.

- 3.2** The main potential noise effect from these airports is temporary disturbance and annoyance. An aircraft take-off or landing is a short duration event, and for locations close to an airport the sound might cause momentary distraction or interference with activities, such as holding a conversation or reading. For Queenstown Airport, which has more regular aircraft take-off and landing activity, responses may differ, due to behavioural adjustments that are likely to occur from repeated exposure to aircraft sound.
- 3.3** Aircraft can also generate sound while idling on the ground, and when taxiing. The audibility of aircraft on the ground could affect amenity. However, for most aircraft these activities only last for a few minutes, and are generally quieter than take-offs and landings.
- 3.4** Aircraft in flight can be audible over a wide area and can also affect amenity. I am aware the Resource Management Act 1991 (**RMA**) has limitations on the extent to which the noise effects of aircraft in flight can be addressed. In some situations, consideration has been restricted to the noise effects from aircraft only when they are lower than 500 feet above the ground, but in other situations effects have been considered several kilometres from an airport at which point aircraft are higher than 500 feet. For example, noise contours and associated land use controls in district plans extend a significant distance from major airports including Christchurch, Auckland and Queenstown airports.
- 3.5** For Queenstown Airport, for the purpose of assessment in relation to designation 29 (given the proximity of QEC to the Airport), all noise effects I discuss in my evidence relate to aircraft lower than 500 feet above the ground. For Glenorchy Airstrip, parachute and aerotow hang-gliding operations in particular will cause noise effects in the same general area when aircraft and parachutists are both lower and higher than 500 feet above the ground. I have therefore considered noise effects from all parts of these operations at Glenorchy Airstrip (i.e. beyond 500 feet above the ground).

4. NOISE LIMITS

- 4.1** Aircraft sound is generally described in terms of the L_{dn} , which is the day/night sound level. It is essentially an average level over 24 hours, with any sound occurring at night penalised by +10 dB before being included in the average.

For aircraft, the L_{dn} level is usually further averaged over a number of days or months, as I discuss below.

- 4.2** NZS 6805 and NZS 6807 recommend airport noise limits of 55 dB L_{dn} and 50 dB L_{dn} for fixed wing aircraft and helicopters respectively. The lower limit for helicopters is due to the greater annoyance caused by their characteristic blade sounds. I consider these noise limits to be generally appropriate to determine locations at which noise effects from an airport are acceptable. For Queenstown Airport I consider the use of the L_{dn} noise limit from NZS 6805 to be appropriate, due to the regular and frequent aircraft movements.
- 4.3** However, the L_{dn} is an average sound level over three months (fixed wing aircraft) or seven days (helicopters). In my opinion the L_{dn} does not adequately represent noise effects from airstrips with irregular or lower numbers of aircraft movements, such as Glenorchy Airstrip. In this instance, I consider the approach in NZS 6805 to be further compromised as the recommended noise limits are predicated on the basis that aircraft take off and depart, rather than stay in the general area and climb to altitude then immediately descend to land (as is the case, for example, with skydiving and aerotow hang-gliding). I am not aware of a standardised or recommended approach for assessing sound for a facility such as Glenorchy Airstrip. In the case of the skydiving operation at Jacks Point the Environment Court found that the noise limits in NZS 6805 at residential and visitor accommodation were not sufficient to protect amenity in the area.⁴
- 4.4** Given the absence of a standardised method or objective parameter to comprehensively quantify noise effects from Glenorchy Airstrip, I consider that in addition to making reference to the L_{dn} sound level criteria discussed above, a broader consideration of noise effects is required when determining appropriate controls. For example, controls on the number of movements, flight paths and hours of operation may be an appropriate response.

5. DESIGNATION #29 – QUEENSTOWN EVENTS CENTRE

- 5.1** Queenstown Airport Corporation (**QAC**) (#433) submitted that conditions for designation #29 (QEC):

⁴ [2014] NZEnvC 108, paragraphs 174-185

- (a) should require buildings for day care and community activities to be designed to reduce aircraft sound to specified levels inside the buildings;
 - (b) should not allow community activities unless they are directly related to the QEC; and
 - (c) should not allow for day care facilities, other than when parents or guardians are using the QEC for its designated purpose.
- 5.2 The QEC site is affected by aircraft sound and falls within the 55 dB L_{dn} Outer Control Boundary (**OCB**). In my opinion it is appropriate for any new buildings in designation #29, which are intended to be used for noise sensitive activities, to be appropriately designed to reduce aircraft sound to an acceptable level inside. I consider the building requirements proposed by QAC are appropriate, but are unnecessarily duplicated for two activities in the revised provisions C.22 conditions 4 and 7. For efficiency, the acoustic treatment requirement could apply to all buildings in the designation and not separately for specific allowed activities. I consider the second paragraphs of C.22 revised conditions 4 and 7 should be deleted and a single new condition should be inserted under the “Buildings” subheading of C.22 as follows:
- Buildings containing an Activity Sensitive to Aircraft Noise shall be designed to achieve an Indoor Design Sound Level of 40 dB L_{dn} within any Critical Listening Environment, based on the 2037 Noise Contours. Compliance shall be demonstrated by either installation of mechanical ventilation to achieve the requirements in Table 5 of Chapter 36 (Noise) or by submitting a certificate to Council from a person suitably qualified in acoustics stating that the proposed construction will achieve the Indoor Design Sound Level with the windows open.*
- 5.3 In respect of QAC’s submission points relating to provision for community activities and day care facilities, as per the condition proposed above, buildings can be designed to provide acceptable internal sound levels. On this basis, I consider that a broader range of day care and community activities might be appropriate at the QEC site than submitted by QAC and recommended in the Section 42A report.

6. DESIGNATION #239 – GLENORCHY AIRSTRIPO

- 6.1 Wyuna Preserve Residents Association (#744) submitted that designation #239 should be subject to various conditions that would manage noise effects from Glenorchy Airstrip.
- 6.2 I do not have information on the current use of Glenorchy Airstrip or corresponding sound data. From the Reserve Management Plan and tourism operator websites I am aware the airstrip is used by various operators, including Skydive Paradise, Skytrek aerotow hang-gliding (in winter), and Heli Glenorchy. It appears that Glenorchy Airstrip has been in use for many years for similar activities.
- 6.3 As indicated above, the nature of the activities at the Glenorchy Airstrip is such that it is difficult to establish an appropriate Ldn level. Instead I consider controls on the number of movements, flight paths and hours of operation may be an appropriate regulatory response.
- 6.4 The Reserve Management Plan has an objective that *“The nature, scale and intensity of the use of the airstrip remain generally unchanged from the level that exists from the date of adoption of this plan”* [August 2016]. The Reserve Management Plan sets out how all operators using the Airstrip will require leases/licences/permits granted by QLDC. I understand from QLDC that licences will specify the number of flights each operator can make from the airstrip, to achieve the above objective that the status quo is generally maintained.
- 6.5 In terms of noise management, I consider that the licence system proposed under the Reserves Management Plan is an important and effective control measure. Given that the Reserves Management Plan provides this control, there is no technical reason why duplicate or additional controls on flight numbers or noise levels should be imposed as designation conditions. It is generally preferable to maintain a single place where noise controls are located to provide clarity and efficiency of implementation.
- 6.6 The Section 42A report recommends designation conditions restricting the hours of operation of the airstrip and requiring adherence to “Fly Neighborly” guidelines.

- (a) Revised C.82 condition 1, restricts use of the airstrip to the district plan daytime period between 0800h and 2000h, or between morning and evening civil twilight if they result in a shorter period. This condition repeats a policy requirement of the Reserve Management Plan. In terms of managing noise effects, this limitation is beneficial, although the proposed designation condition simply duplicates an existing requirement.
 - (b) Revised C.82 condition 2 refers to "Fly Neighborly" guidelines. I consider that these guidelines, prepared by the Helicopter Association International, represent good practice for helicopter noise management. These do not apply to fixed wing aircraft. However, elements of the guidelines have been used to deliver the same benefits in terms of fixed wing aircraft. The Reserve Management Plan provides appropriate good practice requirements for fixed wing aircraft and helicopters including avoidance of overflying or undertaking circulatory flights over residential areas. Again, the designation condition appears to duplicate the Reserve Management Plan.
- 6.7** As set out above, in my opinion the Reserve Management Plan includes appropriate noise control measures for the Glenorchy Airstrip. I understand these controls can be efficiently and practically enforced through the licence system. In terms of managing noise effects these controls should not need to be duplicated in designation conditions.



Dr Stephen Gordon Chiles

7 October 2016