

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of proposed Plan Change 13 to the
Central Otago District Plan

**STATEMENT OF EVIDENCE OF STEPHEN GORDON CHILES
FOR PUBLIC HEALTH SOUTH IN RELATION TO ACOUSTICS**

16 May 2019

QUALIFICATIONS AND EXPERIENCE

1. My full name is Dr Stephen Gordon Chiles. I am self-employed as an acoustician through my company Chiles Ltd. I have been employed in acoustics since 1996, as a research officer at the University of Bath, a principal environmental specialist for the NZ Transport Agency, as a consultant for the international firms Arup, WSP, and URS, and for the specialist firms Marshall Day Acoustics and Fleming & Barron.
2. I am subcontracted by Southern Monitoring Services to provide the Environmental Noise Analysis and Advice Service ("ENAAS") part-time for three years from July 2018, advising the Ministry of Health and Public Health Services on environmental noise.
3. I have degrees of Doctor of Philosophy in Acoustics from the University of Bath, and Bachelor of Engineering in Electroacoustics from the University of Salford. I am a Chartered Professional Engineer in acoustics and a Fellow of the UK Institute of Acoustics. I have made acoustics assessments and designs for numerous developments including infrastructure, industrial, commercial, recreational and residential activities.
4. With respect to motorsport noise, I was engaged by the Canterbury Car Club between 2013 and 2016 for appeals on Plan Change 52 to the Christchurch City Plan, regarding Ruapuna Motorsport Park ("RMP"). I was actively involved in a working group with affected neighbours to develop a noise management plan. I am currently advising the Christchurch City Council regarding a proposed relocation of the Canterbury Kart Club.
5. I am convenor of the New Zealand industry reference group for the committee responsible for approximately 200 published "ISO" acoustics standards. I was Chair of the 2012 New Zealand acoustics standards review, Chair for the 2010 wind farm noise standard, and a member for the 2008 general environmental noise standards.
6. I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014. This evidence is within my area of expertise except where I state that I am relying on facts or information provided by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

SCOPE OF EVIDENCE

7. My predecessor providing the ENAAS service, Mr Vern Goodwin, advised Public Health South ("PHS") in preparing its submissions with respect to environmental noise on proposed Plan Change 13 ("PC13") to the Central Otago District Plan. I discussed the issues with Mr Goodwin at the time and I agree with the approach of the PHS submission. I subsequently advised PHS in relation to its further submission, and I have prepared this statement of evidence in relation to the acoustics matters raised in the PHS submission and further submission.
8. My evidence provides independent information relating to noise effects on future residents of the PC13 land. I will also address the efficacy of potential control measures.
9. I have read the Styles Group report dated 20 June 2018, attached to the submission of River Terrace Developments Ltd, and the evidence of Jon Styles dated 23 April 2019. Since January 2019 I have corresponded with Mr Styles and Rob Hay & Aaron Staples of Marshall Day Acoustics, seeking to arrange conferencing between acoustics experts. I understand this will now occur after evidence exchange.
10. I made a site visit on Sunday 7th April 2019 during the "Festival of Speed" at Highlands Motorsport Park ("HMP"), primarily making observations from Sandflat Road.
11. I have relied on predicted sound levels set out in the Styles Group report and on the evidence of Malcolm Hunt to the Environment Court in 2008 with respect to HMP.
12. I disagree with the conclusions of Mr Styles set out in his report and evidence. I will explain in my evidence why I consider that PC13 would give rise to significant adverse noise effects on future residents that cannot be adequately mitigated.
13. My evidence will address:
 - a. Reverse sensitivity and no-complaints covenants,
 - b. Adverse noise effects on people, and
 - c. Mitigation measures.

REVERSE SENSITIVITY AND NO-COMPLAINTS COVENANTS

14. From my review of PC13 it appears that noise effects on future residents would in turn adversely impact existing activities on surrounding sites. However, I do not consider this “reverse sensitivity” to be a public health effect. The term reverse sensitivity is often used loosely to describe both direct noise effects on people and consequential reverse sensitivity effects. While the term was used in the PHS submission, I will only address direct noise effects on people in my evidence.
15. No-complaints covenants do not address noise effects on people and should not be considered as noise mitigation. Prospective purchasers might be forewarned of potential noise exposure, but assuming the land is still eventually occupied by somebody for residential activity, the harmful public health noise exposure is not avoided or mitigated. The particular residents who end up being exposed to the noise might simply have other constraints precluding the choice of a healthier location.

ADVERSE NOISE EFFECTS ON PEOPLE

16. The World Health Organisation (“WHO”) has published several authoritative guidelines on environmental noise health effects. Many commonly used noise limits in New Zealand are based on the Community Noise Guidelines (“CNG”) published by the WHO in 1999. Parts of the CNG that are often quoted are sleep disturbance effects being observed above a sound level of 30 dB L_{Aeq} inside bedrooms, and people being moderately annoyed by daytime activities with sound levels above 50 dB L_{Aeq} outside, or highly annoyed by levels above 55 dB L_{Aeq} outside.
17. The most recent Environmental Noise Guidelines (“ENG”) published by the WHO Regional Office for Europe in 2018, set out more nuanced guidance for specific sources of primarily transportation noise such as public roads and railways. This shows a range of potential effects from environmental noise including annoyance as a health effect, alongside ischaemic heart disease and other matters. This more recent research generally quantifies the onset of adverse effects at lower sound levels than the CNG. However, in general I consider that guidance in the CNG remains a basis for setting

pragmatic noise limits. The ENG refers to the CNG for sound sources not explicitly addressed by the ENG, such as motorsport activity.

18. Both the ENG and CNG state that noise annoyance is an adverse health effect. Due to the history of environmental noise research, noise annoyance is better understood than other health effects and has informed daytime guideline levels. Paragraphs 53 and 54 of Mr Styles' evidence might suggest that noise annoyance is not a material adverse health effect. In my opinion based on the WHO guidelines, noise annoyance is a pertinent health effect and the guideline levels are relevant in this instance.
19. The PC13 site is affected by several sound sources that will generate more than the WHO night-time guideline of 30 dB L_{Aeq} inside bedrooms, without mitigation. Road-traffic, gas guns, frost fans and helicopters all generate sound on the PC13 land at levels that would be above this threshold inside with windows ajar for ventilation.
20. Mr Styles shows sound from the Central Motor Speedway ("CMS") to be approximately 60 to 80 dB L_{Aeq} outside on the PC13 land, which equates to indoor levels with windows ajar of approximately 45 to 65 dB L_{Aeq} . This substantially exceeds the 30 dB L_{Aeq} WHO guidance for any of this activity that extends into the night period. These sound levels from Mr Styles' report are predicted based on downwind conditions or under a moderate temperature inversion. This is an appropriate conservative basis for assessment of noise effects although the actual sound levels during a particular event may be less depending on meteorological conditions.
21. Based on the road and traffic characteristics, predicted daytime road-traffic sound significantly exceeds the 50 and 55 dB L_{Aeq} WHO outdoor guideline levels for well over 100 metres into the PC13 land from SH6 Kawarau Gorge Road.
22. Mr Styles shows sound from daytime events at HMP and CMS to be approximately 65 to 75 dB L_{Aeq} and 60 to 80 dB L_{Aeq} respectively across the PC13 land. This substantially exceeds the 50 and 55 dB L_{Aeq} WHO outdoor guideline levels. Mr Styles appears to largely dismiss adverse effects of this exceedance as only being temporary. Of note is that the main motorsport events occur:

- a. outside of winter,
 - b. on weekends, and
 - c. often into the evening for CMS events.
23. Given that noise disturbance from HMP and CMS events occurs at sensitive times for people relaxing around their homes and gardens, I consider it inappropriate to simplistically overlook or discount the adverse noise effect. Most people do accept higher sound levels from occasional community events; but in my opinion, up to 36 days of loud motorsport, through the summer months at weekends and often into the evening, is not in that category.
24. Mr Styles also appears to diminish his assessment of motorsport noise effects by comparing event frequencies with other unrelated activities that may have more constant sound. This comparison is not in accordance with the general assessment standard NZS 6802 and does not account for the high motorsport sound levels that occur across the PC13 land.
25. Mr Styles' modelling for typical daytime motorsport activity at HMP, excluding events, shows sound levels will exceed 55 dB L_{Aeq} in a small part of the PC13 land. However, the resource consent for HMP allows for a wide range of different motorsport activity in different locations, and Mr Styles has only shown results for one scenario. His previous measurements that informed the modelling would only have recorded activity occurring at the time. He does not appear to have modelled karts, dirt buggies or jet boats for example. It is likely that some types of consented motorsport in different areas of HMP could comply with noise limits at the Kawarau Gorge Road compliance points but exceed 55 dB L_{Aeq} at the PC13 land. In my opinion it is realistic to assume that regular daytime consented activity at HMP could often exceed 55 dB L_{Aeq} at the PC13 land. The lower 50 dB L_{Aeq} WHO guideline would be exceeded by most activity.
26. Aside from the WHO guidelines, I am not aware of national or international standards or guidance relating to specific noise effects from motorsport. From my experience with Ruapuna Motorsport Park ("RMP") I am aware that many people find motorsport

sound more disturbing than other environmental noise. General noise limits are based on generic research and are applied to a wide range of sources, although human responses to different sound sources vary. In my experience, people respond to motorsport sound at lower levels than other general sources. Mr Styles does not appear to have accounted for the characteristics of motorsport sound in his assessment.

27. RMP is similar to HMP with some of the same race vehicles using both facilities. There is a raceway and speedway in both locations. RMP appears to be currently used by a wider range of activities such as drag racing, drifting and motorbikes. From its website, HMP appears to have more frequent routine use for commercially run driving experiences and go karts.
28. Rules in the Christchurch District Plan allow for frequent events at RMP compared to only 16 at HMP. However, the nearest neighbours are further away from RMP, such that events at RMP are in the order of 55 dB L_{Aeq} outside at the houses. Nevertheless, those neighbours still reported substantial noise disturbance from RMP and sought tighter restrictions through appeals to the Environment Court. In my discussions with them, the RMP neighbours often referenced ongoing weekday activity at RMP as being disturbing, even at lower sound levels than events. My understanding is that some of that weekday activity at RMP is similar to the commercial driving experiences that are currently advertised as being available most days at HMP. There is also a wide range of other consented activities that could occur at HMP on a frequent basis.
29. In summary with respect to daytime motorsport sound, there will be regular exceedance of WHO guideline levels both during events and potentially during normal daily activity. On this basis and from my experience with RMP, in my opinion there will be significant disturbance and adverse noise effects throughout the PC13 land.
30. Mr Styles criticises the Section 42A report for listing various rural sound sources in addition to frost fans and gas guns. In my opinion it is relevant to consider the cumulative noise effects that arise from all sound sources affecting the PC13 land. There would be a cumulative effect on future residents in the PC13 land arising from

multiple sources of sound, some simultaneously and some at different times. Considering all sources together, in my opinion this environment is unsuitable for residential activity.

MITIGATION MEASURES

31. As set out above, I consider that no-complaints covenants do not provide noise mitigation for adverse noise effects on public health.
32. Internal sound levels in houses can be reduced with enhanced glazing, kept closed and with alternative ventilation, heating and cooling. The PHS submission sets out a specification for both sound insulation and ventilation. That submission is for a higher standard than recommended by Mr Styles. The sound insulation criteria recommended by Mr Styles can be achieved by standard building constructions with no specific sound insulation, whereas those recommended by PHS at least require enhanced glazing. The PHS submission also sets out a ventilation specification requiring some heating and cooling.
33. Mr Styles makes reference to sound insulation and ventilation as being a common approach for noise mitigation. I agree this mitigation is often used, but primarily for land where residential development is already permitted or in constrained urban environments. For a less constrained area such as Cromwell, providing for an outdoor living lifestyle, in my opinion appropriately locating sensitive activities to avoid adverse noise effects is the good practice approach.
34. While sound insulation and ventilation could be used to address some noise effects on the PC13 land, it is a compromise. In my experience people prefer the freedom to open windows and doors for cooling and ventilation. During the daytime and evening, most people expect to be able to enjoy outdoor living, rather than having to close themselves inside, particularly through the summer and at weekends. Again, a compromise of protecting only indoor spaces may be appropriate in constrained urban environments, but in my opinion it is inconsistent with the style of residential development proposed by PC13.

35. I understand from my predecessor Mr Goodwin that public health units normally make neutral submissions on plan change proposals with respect to noise matters, seeking only that appropriate criteria for the protection of health are achieved. In this case, while it is a compromise, building treatment may be feasible for matters such as frost fan and road-traffic noise. However, for motorsport noise the high exposures during events and prolonged exposures at other times make that approach untenable. For this reason, on Mr Goodwin's advice, PHS took the unusual step of opposing PC13 with respect to adverse noise effects.
36. In my opinion there are no practical noise mitigation measures available that could adequately address adverse effects from motorsport noise on the proposed PC13 development.
37. There were previously residents living within a few hundred metres of RMP. The Christchurch City Council determined that noise effects from louder events up to around 60 dB L_{Aeq} were unreasonable, and consequently offered to buy seven houses to avoid that existing noise disturbance. By 2015, six of those house purchases had been completed. The Christchurch District Plan (rule 6.1.7.1.5) now makes any new noise sensitive activity non-complying within the "Ruapuna Inner Noise Boundary", which equates to approximately 60 dB $L_{Aeq(1h)}$ during an event. This motorsport sound level will be routinely exceeded throughout the PC13 land. While RMP and HMP are not directly comparable, in my opinion the same rationale for removing existing and avoiding new noise sensitive receivers near RMP should apply to HMP. I consider a motorsport park and residential activities to be fundamentally incompatible in terms of noise, such that they should be physically separated to protect public health. Residential sections near a motorsport park would have poor amenity, with residents likely to suffer from significant noise disturbance.

Dr Stephen Chiles

16 May 2019