

IN THE MATTER OF the Resource Management Act 1991

BEFORE Tasman District Council

AND

IN THE MATTER OF an application by Adcock &
Donaldson Properties Ltd to
establish a Motorsport Park at
Stanley Brook

EVIDENCE OF RUSSELL CHARLES MALTHUS

RUSSELL CHARLES MALTHUS
SENIOR ENVIRONMENTAL HEALTH CONSULTANT
VIASTRADA LIMITED

1 March 2012

INTRODUCTION

1. My name is Russell Charles Malthus. I am an Environmental Health Consultant employed by ViaStrada Limited, a specialist traffic engineering and planning consultancy that provides resource management related advice to local authorities and private clients.
2. I hold the qualification of Bachelor of Applied Science (Environmental Health) from Massey University and diplomas issued by the Royal Society of Health in Public Health Inspection, Air Pollution Control and Noise Control. I am a full member of the Acoustical Society of New Zealand and a registered member of the New Zealand Institute of Environmental Health.
3. My experience includes thirty years employment by the Christchurch City Council as an Environmental Health Officer with responsibilities in environmental health, including the assessment, monitoring, compliance and enforcement of adverse effects of land use and reporting on non-notified and notified resource consent applications. This experience included drafting and monitoring noise performance standards for motorsport activities at the Ruapuna Raceway and Carrs Road Raceway, monitoring noise from those facilities, and responding to complaints. Since leaving the Council in 2004 I have provided consultant advice to private clients and consenting authorities on environmental health matters, including the assessment of effects for resource consent applications and notices of requirement.

SCOPE OF EVIDENCE

4. I have been engaged by Adcock & Donaldson Properties Ltd to provide expert advice on noise issues related to this application.
5. In this evidence I will present my assessment of those issues with due regard to relevant sections of the Resource Management Act (the RMA), the Proposed

Tasman Resource Management Plan (the TRMP), and relevant standards and guidelines relating to noise levels and effects on health and amenity.

6. The proposal is fully described in the application and Assessment of Effects on the Environment (AEE) which were prepared by Mr Tony Quickfall, the applicant's planning consultant. I do not intend to repeat that information except where it is relevant to this evidence.
7. I have read the Council Officer's report prepared by Mr Mackiggan and Mr Andrew, and the memoranda of Mr Caradus, Ms Moulam and Mr Harcom relating to noise. I will comment on relevant matters in those reports in my evidence.
8. I will also comment on public submissions which oppose the application on ground of noise.
9. While not essential for this hearing, I have prepared my evidence with regard to provisions relating to expert witnesses in the Environment Court's Consolidated Practice Note 2011.
10. This evidence is within my area of expertise, except where I state I am relying on what I have been told 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.

THE PROPOSAL

11. Referring to the AEE and to the Plans submitted with the application, the following activities potential to generate noise that should be considered in terms of compliance with the District Plan noise rules, and potential effects on other land uses:

- Motorsport activities
 - Dragstrip/ Grand prix racing circuit
 - Motorcross track, and "peewee" track for children
 - Supermotard motorcycle area
 - Off-road track for quad bikes and buggies
 - Rally road
 - Driver training and vehicle testing on various tracks
 - Lake for jetskiing and waterskiing

- Other activities and aspects
 - Outdoor concert arena
 - Airstrip/aerodrome
 - Helipads (2)
 - Traffic noise on public roads

12. Other activities identified and discussed in the AEE, such as cycle tracks and trails, Zip line and confidence course, would not generate any significant noise in terms of this effects assessment.

DISTRICT PLAN NOISE RULES

13. Rural 2 Zone rule 17.6.2.1(d) applies the following noise limits to permitted land use activities in the Rural 2 zone when measured at or within the notional boundary of any dwelling on any adjacent site in a rural zone, or at or within the boundary of any site within the residential zone:

	Day	Night
Leq	55 dBA	40 dBA
Lmax		70 dBA

14. Notes to the rule state:

Day = 7.00 am to 9.00 pm Monday to Friday inclusive and 7.00 am to 6.00 pm Saturday (but excluding public holidays).

Night = All other times, plus public holidays.

Noise must be measured and assessed in accordance with the provisions of NZS 6801:2008 Acoustics - Measurement of Environmental Sound and NZS 6802:2008 Acoustics - Environmental Noise.

15. "Notional Boundary" is defined in Chapter 2 of the TRMP as:

- (a) a line 20 metres from the façade of any rural dwelling that is most exposed to the noise source; or
- (b) the legal boundary of the site of the dwelling, where this is closer to the dwelling than (a).

16. In Attachment 1 of this evidence, I have included for reference some simplified information about the noise terminology used in the TRMP and my assessment.
17. Noise emitted from the proposed activities is predicted to comply with the "Night" limits at the notional boundaries of rural dwellings in the vicinity, and will be reasonable in the context of guideline limits of acceptability for the protection of sleep, health and amenity in NZS 6802:2008. Those guideline limits are 55 dB LAeq during daytime and 45 dB LAeq/75 dB LAFmax night-time.
18. I note that draft condition 3 for the principal consent (RM100848) in the Officer's report applies the limits from rule 17.6.2.1(d) to this application, although "Day" and "Night" are redefined as follows:
 - Night = 9.00 pm to 7.00 am inclusive.
 - Day = all other times but excluding Saturdays 6.00 pm to 9.00 pm, Sundays and Public Holidays.
19. It is not clear why the wording of this draft condition is different to the rule. One of the possible interpretations of this wording is that it removes any limits between 6:00 pm and 9:00 pm Saturday, and from Sundays and Public Holidays. To ensure certainty and consistency, I consider that the wording of the rule should apply, as the activity will comply with its requirements.

THE SITE AND ITS ENVIRONMENT

20. In my opinion, the application site is very well located in terms of mitigation of noise effects. The topography of this site and the surrounding environment and its isolation from noise-sensitive land uses meet the requirements of the first paragraph on page 31 of the Officers' report, which states:

The nature of the recreational activity is such that it is really dependent on a relatively isolated or secluded rural area where the main impacts of noise and dust are not likely to create cross boundary land use conflicts.
21. The site is in a narrow river valley, at least 3.7 km south of the closest noise-sensitive land uses, which are rural dwellings near the intersection of Stanley Brook Road and Upper Stanley Brook Road. The closest dwelling is approximately 3.7 km from the site's north boundary on the adjacent property that is owned by the K and J

Rowe Family Trust, which has submitted in opposition to the application on grounds of noise effects. That dwelling is approximately 6 km from the proposed drag strip and 4 km from the proposed rally road and off-road track, and it is approximately 6 km from Rabbit Gully Road, which provides traffic access to the site via Olivers Rd from the Motueka Valley Highway. Topographical maps indicate that this dwelling is about 60 m lower than the application site, which is at about 240 m above sea level.

22. To the west, the site is totally shielded from Tapawera township and rural dwellings by hills with a ridge at least 400 m above sea level. The closest dwelling on that side is that of LF Rietsma and DJ McQueen, who also oppose the application on grounds of noise. Their dwelling is set back approximately 130 m to the south of Olivers Road, and is at an elevation of approximately 220 m.
23. To the east and south are hills and river valleys. The closest dwellings are approximately 4.2 km to the south east, shielded from the site by hills that are at least 400 m above sea level.

NOISE CHARACTERISTICS OF THE SITE AND AREA

- **Drag and rally car noise testing**

24. To gain an impression of the noise attenuating qualities of the valley, Mr Adcock arranged for a drag car and two rally cars to be operated on the application site so that noise measurements and observations could be carried out by Mr Caradus, Ms Moulam, Mr Harcom, Mr Quickfall and myself. The measurements and observations were carried out between 10:30 am and 12:30 pm on 22 December 2011.

25. A description of the vehicles has been supplied by Mr Adcock:

- Drag Car Description and spec:
1971 VG Valliant, 446ci Mopar Chrysler Motor
Competition based super street racer class and capable of super gas class
Owner: Richard Ayers
- Rally Car 1 Description and spec:
1985 BMW M3 CSL 3200cc
Factory specification with modified suspension and exhaust
Owner Garry Adcock
- Rally Car 2 Description and spec:

1976 Ford Escort 1600cc
BDA specification fitted with Toyota 4AGE motor
Owner Garry Adcock

26. Photographs of these vehicles taken at the site are shown in Attachment 2 of this evidence.
27. The Drag Car was operated in a field near the junction of Rabbit Gully Road and Moulders Rd, in the vicinity of NZ map grid reference E2498646 – N5977725. This position was selected because it corresponds with the start position of the proposed dragstrip. The car was positioned facing north, which is the direction of travel on the strip. For the testing, it was started and run to full revs by Mr Ayers for short bursts of time.
28. The Rally Cars ran north in close tandem from near site 1 and along Stanley Brook Road to a forested area near the north boundary of the application site, and returned.
29. The approximate locations of the drag test location, the rally car route, the monitoring sites and the properties of Rowe and Reitsma and McQueen are shown in Attachment 3.

- **Noise measurement and observation methodology**

30. I carried out sound level measurements and observations in unison with Mr Harcom at Site 1. This site is near the junction of Rabbit Gully Rd and Moulders Rd, about 6.7 km south of the Rowe dwelling, and approximately 2.5 km south of the north boundary of the application site which adjoins that property. Our meters were approximately 20 m (paced) from the rear right corner of the drag car, which captured as much exhaust and engine noise as possible. The meters were a similar distance from Rabbit Gully Road.
31. Mr Quickfall and Mr Caradus took measurements and observations at Sites 2 and Site 3. Site 2 is near the north boundary of the application site which adjoins the Rowe property. Site 3 is at the notional boundary of the rural residence of the Rowe property, i.e. a line 20 metres from the facade of the dwelling, which is the noise measurement point specified in Rural 2 Zone rule 17.6.2.1(d) of the TRMP.
32. Ms Moulam observed at Site 4, which is on Cemetery Rd on the Tapawera side of the hill approximately 270 m from the Tapawera Highway. No measurements were taken at that site.

33. Mr Quickfall returned later that day to the top end of Olivers Rd near the Rietsma/MCQueen property (Site 5) and to Upper Stanley Brook Rd near the Rowe property (Site 6) to take measurements and observations of ambient noise after 10 pm.
34. Prevailing weather conditions observed at sites 1 to 4 were 40 to 50% cloud, calm or light northerly breeze generally less than 2m/s, 22°C. At sites 5 and 6, the temperature was about 20° C with no wind, estimated 30% cloud cover.

- **Specification of noise monitoring equipment**

35. The specification of equipment used by Mr Quickfall and myself is as follows:
- Bruel and Kjaer Type 2238 Integrating Sound Level Meter S/N 2231557, fitted with Type 4188 Microphone S/N 2230583.
 - Bruel and Kjaer Type 2238 Integrating Sound Level Meter S/N 2160204, fitted with Type 4188 Microphone S/N 2156951.
 - Type 4230 Acoustic Calibrator S/N 752968.
36. This equipment was within current laboratory calibration, and fulfils IEC 651-1979 and IEC 804-1985 for Type 1 meters as required by NZS 6801:2008 *Acoustics – Measurement of Environmental Sound* and in accordance with Rural 2 Zone rule 17.6.2.1(d).
37. The specification of Mr Harcom’s equipment is described in his memorandum.

- **Noise levels and observations**

- (i) **Drag car and Rally cars**

38. Table 1 below summarise the measurements and observations of noise from the drag car. The car was only distantly audible at site 2, and was inaudible at sites 3 and 4.

Table 1 Drag Car sound level measurements and observations, 22/12/2011

Location	Start time	Duration	dB LAFmax	dB LAeq	dB LA90	Observer
Site 1	11:14 am	36 secs	97	91	73	Harcom
	11:14 am	27 secs	99	92	74	Malthus

	11:51 am	56 secs	100	89	70	Harcom
	11:51 am	44 secs	100	90	71	Malthus
Site 2	11:12 am	3 min 17 s	51	39	31	Caradus/ Quickfall
			<u>Drag car distantly audible 37 dBA</u>			
Site 3	11:46 am	4 min 19 s	53	44	36	Caradus/ Quickfall
			<u>Drag car inaudible</u>			
Site 4	<u>Drag car inaudible</u>					Moulan

39. Table 2 below summarises the measurements and observations of noise from the rally cars while being operated on Rabbit Gully Rd near site 1, and while being operated in the forest block at the north end of the site approximately near site 2. The cars were barely audible from site 2 to site 1 (approx 2.7 km, and downwind on this occasion), inaudible from site 1 to site 2 (approx 2.7 km upwind), and inaudible at site 4.

Table 2 Rally car sound level measurements and observations, 22/12/2011

Location	Start time	Duration	dB LAFmax	dB LAeq	dB LA90	Observer
Site 1	11:23 am (0.5 km sprint to ford)	46 sec	89	75	< 50	Malthus
	11:24 am (0.5 km sprint returning)	55 sec	84	71	46	Harcom
		48 sec	84	71	< 50	Malthus
	12:11 pm	1 min 34 s	49	38	35	Harcom
<u>Rally cars operating near north boundary: barely distinguishable over ambient noise</u>						
Site 1	12:23 pm (returning from near Site 2)	2 mins	84	65	42	Harcom
		1 min 37 s	85	66	42	Malthus
Site 2	12:12 – 12:25 pm	<u>Rally cars operating at 400 m: 33-37 dBA</u>				Caradus/ Quickfall
		<u>Rally cars operating near site 1: inaudible</u>				
Site 3	Not monitored					

Site 4	<u>Not audible</u>	Moulán
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(ii) **Ambient noise levels**

40. Ambient noise measurements were also undertaken at the test monitoring sites, and are summarised in Table 3 below

Table 3 Ambient sound level measurements, 22/12/2011

Location	Start time	Duration	dB LAFmax	dB LAeq	dB LA90	Operator
Site 1	10:58 am	1 minute	47	39	37	Harcom
	10:58 am	2 min 55 s	58	39	37	Malthus
	12:16 am	3 min 01 s	56	38	35	Malthus
Site 2	11:12 am	3 min 17 s	51	39	31	Quickfall
Site 3	11:46 am	4 min 19 s	53	44	36	Quickfall
Site 4	No ambient measurements taken					
Site 5	10:00 pm	3 min 29 s	44 (47 pukeko)	<30	<30	Quickfall
Site 6	10:30 pm	3 min 29 s	51	37	36	Quickfall

41. Ambient noise sources contributing to these measurements were noted as:

- Site 1: insects, occasional birdsong and distant cattle lowing, river noise
- Site 2: birds, river noise
- Site 3: dogs barking
- Site 4: insect and bird noise, livestock, trees, faint traffic on Motueka Valley Highway.
- Site 5: pukeko (LAFmax)
- Site 6: cows lowing (LAFmax)

42. It is reasonable to expect that these ambient levels would be representative of the noise climate for this area at other times, under similar weather conditions. Higher levels would be expected at times when forestry work is being undertaken in the valley, or under strong wind conditions or heavy rain. Vehicle noise on the Highway will also be audible at residential properties on the Tapawera side of the hill, although this will reduce significantly at night-time.

ASSESSMENT

43. The noise tests summarised in Tables 1 and 2 above indicate that noise from the vehicles being operated on this occasion was inaudible at the closest residential properties. Noise levels from the drag car and rally cars measured near the Rowe property at Site 2 were below the “Night” limits in the TRMP, and were not significantly different to ambient noise levels.
44. However, the following limitations are recognised in this testing:
- the prevailing wind was away from the receiver and towards the noise source. An opposite wind direction would be likely to return a different result.
 - the drag car that was tested is a “Street” class car, and is not in the noisiest class that could run on the dragstrip, which is a “Top Fuel” dragster.
 - cumulative noise from more than one of the noisiest activities could result in higher levels off-site.
45. For these reasons, the applicant has engaged Marshall Day Acoustics Ltd to carry out computer modelling of noise contours to determine predicted levels of noise that would be generated when wind blows towards the Rowe property, for potentially worst case operation of the noisiest activities. I will now address their report, which is presented in Attachment 4 of this evidence.
- **Noise Contour modelling by Marshall Day Acoustics (MDA)**
46. MDA have carried out the contour modelling using SoundPLAN, an internationally recognised modelling software package. Drawing from their experience in monitoring and reporting on motorsport events, they have used data in Table 1 of their report to model for “worst case” use of the following noisiest activities:
- Dragstrip (Fig 1)
 - Motocross Track (Fig 2)
 - Off-road and Rally racing operating concurrently (Fig 3)
 - Cumulative racing noise from all the above operating concurrently (Fig 4)

47. Page 2 of the report notes that the SoundPLAN predictions have been carried out in accordance with ISO 9613-2:1996. That standard requires noise attenuation to be calculated for downwind noise conditions, i.e. wind blowing from the south and towards the Rowe property. I understand from Mr Quickfall's "local knowledge" that the most prevailing wind conditions in the area are west/north-west, which would blow noise away from the Rowe property for most of the time and move the contours further away from that property. Any properties to the south-east that are downwind under those conditions would be protected by the higher hills and greater distances in that direction.
48. Figures 1 to 4 show contours for noise received at a height of 1.5 m above ground level, which corresponds to the typical height of a receiver in an outdoor living environment. The 40 dB LAeq contour corresponds to the TRMP "Night-time" standard. In each of the Figures, the 40 dB LAeq contour does not extend to the notional boundary of any rural residential property within or beyond the Stanley Brook valley. In Figures 3 and 4, for Off-road/Rally racing and Cumulative noise, the contour approaches the Rowe residence. While this indicates noise will be audible at the Rowe residence from time to time above background (LAF90) levels as are indicated by Table 3 of this evidence, the levels will comply with the TRMP limits, which are very conservative in terms of guideline limits of for the protection of sleep, health and amenity as previously noted.
49. With regard to the balance of the Rowe's property, Figure 4 indicates that levels of noise could exceed 55 dB LAeq within 1 km of the application site, however as there are no noise-sensitive activities on the land, no effects are anticipated from these levels.
50. Referring to the points of discussion on page 3 of MDA's report, point 1 states that actual levels over the course of an hour or day will be lower than the predicted levels, which are short-term average LAeq levels, because motorsport noise levels are intermittent (i.e. separate races interspersed with intervals).
51. Point 2 of MDA's discussion explains that motorcross noise has been assessed on a worst case basis, by using the maximum levels specified by the governing body, Motorcycling New Zealand. It is relevant to note that noise emission limits are also enforced on competition vehicles at motorsport circuits in NZ, i.e. 95 dBA at 30 m.

52. Referring to point 3, MDA suggests that further consideration should be given to dragster noise that may be sustained for several seconds at levels of 102 dB LAFmax at 150 metres. Information published by San Bernardino County in California ¹ indicates that level of noise would be associated with “Top Fuel” (i.e. nitromethane fuel) dragsters. Information published by the NZ Drag Racing Association (NZDRA) ² indicates there is currently only one dragster of this type in the country, and it holds a record time of 5.4 seconds over a quarter of a mile. I am advised by Mr Adcock and Mr Ayers that such vehicles would visit the site infrequently, to carry out one or two Exhibition runs on special occasions. The majority of events will involve vehicles of other less powerful classes listed by the NZDRA ³ that take 7 to 13 seconds over a quarter of a mile.
53. In terms of the relative noise outputs of those other classes of dragster, information published by San Bernardino County in California ⁴ indicates that the more powerful Group 1 “Top Alcohol” and “Top Doorslammer” classes using alcohol fuel typically have LAFmax levels that are 5 dBA lower than the Top Fuel class, while the lower powered Group 2 and 3 classes are 10 to 15 dBA quieter. Assuming that noise from the Top Fuel dragster level is 102 dBA Lmax at 150 m, then noise from the Group 1 dragsters would be 97 dB LAFmax at 150 m; Group 2, 92 dB LAFmax; and Groups 3 and 4, 87 dBA LAFmax. The San Bernardino information indicates that the highest levels of noise are typically generated in the first 5 seconds of a race, and the remainder of any race does not feature in calculations.
54. A worst possible case noise scenario for dragster noise would be for the NZDRA Nationals to be held at the application site, with a visiting Top Fuel dragster doing Exhibition runs. NZDRA’s program for the 2011 NZ Nationals ⁵ indicates that up to 4 runs would occur for each of the various classes over a 4 to 6 hour period. It is reasonable to assume that the three noisiest classes could run in any one hour period during the event. Assuming that LAFmax levels were sustained for 5 seconds for each of those runs, the energy average calculated in accordance with NZS6802:2008 would be 83 dB LAeq (15 min), or 77 dB LAeq (1 hr), at 150 m.

¹ <http://www.sbcounty.gov/Uploads/lus/Valley/AutoClubSpeedway/AppendixE1TechnicalNoiseAnalysis.pdf>

² <http://www.nzdra.co.nz/downloads/nat-records-file-/index.php>

³ <http://www.nzdra.co.nz/race-classes.html>

⁴ <http://www.sbcounty.gov/Uploads/lus/Valley/AutoClubSpeedway/AppendixE1TechnicalNoiseAnalysis.pdf>

⁵ <http://www.nzdra.co.nz/race-schedule.html>

From those values, levels calculated at the Rowe's notional boundary 6 km away are 70 dB LAFmax and 51 dB LAeq (15 min) or 45 dBA Leq (1 hr) when attenuation by distance alone is taken into account. However additional attenuation by atmospheric absorption and ground effects of the valley's topography would be expected to reduce noise to levels that comply with the "Night" limits of 70 dB LAFmax and 40 dB LAeq in the TRMP. Levels during local or regional competitions and normal club-related events would be expected to be lower, when there are fewer runs by the noisiest vehicles.

55. Point 4 explains that Kart Racing and motor racing on the main circuit have not been considered in the modelling, as noise levels would be similar to the V8s that have been included in modelling for the rallyroad/off road circuits which are closer to the Rowe dwelling.
56. Point 5 explains that noise from outdoor concerts has not been included, as noise from such events would be lower than the motorsport activities which have been modelled.
57. Having regard to these matters, I consider that the modelling carried out by MDA for the four noisiest aspects of the proposal operating at the same time can be accepted as representing worst-case operation of the facility, and provides assurance that the noise limits of the TRMP will be complied with at all times.

- **Traffic noise**

58. Traffic noise on public roads is not controlled by the TRMP, however I have considered the potential levels and effects of noise from traffic that would be received at the Reitsma/McQueen residence which is set back approximately 150 m from Olivers Road. The road in front of the property is currently unsealed.
59. The traffic assessment prepared by Mr Petrie indicates that initially, major events could attract 700-800 vehicles increasing over time to 2000 vehicles arriving at or leaving the site within two peak periods of 1.5 – 2 hrs. At other times, up to 200 vehicles per day are expected to pass this site when the site is fully developed, although Mr Petrie advises that flows in the range of 20-50 vpd would be expected in the foreseeable future.
60. I am advised that the applicant proposes a condition that the Oliver's Road shall be sealed for the full length of the public road when the average daily traffic count

reaches 200 vehicles per day. In the interim, the existing gravel surface would be improved by grading and rolling, which may reduce noise to some extent.

61. Calculated noise levels generated by Mr Petrie's predicted numbers of movements that would be received at the notional boundary of the Reitsma/McQueen residence are as follows:

Road surface	Use	Vehicles per peak hour	dB LAeq	dB LAFmax
Unsealed	Maximum	100 max	56	68
Sealed	Normal	100 max	47	65
Sealed	Special event	1300 max	60	65

62. The calculations for the unsealed road assume a peak hour flow of 100 vph, based on a maximum flow of 200 vpd before sealing is required. The predictions are based on actual measurements on 22 December 2011 of noise from Mr Adcock's rally cars and his Holden 4WD as they drove at about 50 km/hr on Olivers Rd outside the Rietsma/McQueen property. Reference levels of 85 dB LAE and 84 dB LAFmax were recorded at 3 m from the road. The predicted levels at the submitters' property allow for -13 dBA attenuation by distance and ground cover, as indicated by the Calculation of Road Traffic Noise (CRTN - ISBN 0 11 550847 3) method issued by the UK Department of Transport in 1988⁶.

63. The predictions for the sealed road have been calculated using the CRTN method for an impervious road surface, with peak hour flows derived from Mr Petrie's figures for maximum flow under normal use (up to 200 vpd) and very large events (about 1300 vehicles leaving the site within 1.5 hrs, which would occur occasionally).

64. Allowing for the additional 20 m from the notional boundary to the dwelling, and -15 dBA attenuation by the building envelope of the dwelling when windows are open, I estimate that levels inside the dwelling would be 50 dB LAFmax/30-35 dB LAeq during periods of normal use of the sealed road. Those levels are consistent with

⁶ <http://resource.npl.co.uk/acoustics/techguides/crtn/>

guideline levels for indoor living areas and sleeping areas near minor roads, in AS/NZS 2107:2000 Acoustics– Recommended design levels and reverberation times for building interiors and NZS 6802:2008. On the same basis, indoor levels of 50 dB LAFmax/40dB LAeq are indicated for maximum use of the unsealed road, and 50 dB LAFmax/45 dB LAeq for the sealed road after very large events. While those levels are not acceptable for sleep protection under AS/NZS 2107:2000 and NZS 6802:2008, they would occur on an occasional basis and for short periods of time, which is not unusual with large recreational facilities. In any case noise intrusion would be reduced to acceptable levels when windows are closed.

- **Airstrip and Helipads**

65. As noted in section 4.1 of the Officer report, the RMA does not control noise from any over-flying aircraft (refer RMA section 9(5)) but it does apply to the location of landing sites and aircraft noise on the ground. Noise from airstrips and helipads are also excluded from the TRMP noise limits by rule 17.6.2.1(b)(iii). Referring to clause 1.2.1 of NZS 6802:2008, which is referenced in rule 17.6.2.1(d), noise from such activities is outside the scope of that standard.

66. Aircraft landing sites are normally assessed for land use planning purposes under NZS 6805:1992 *Airport noise management and land use planning* and NZS 6807:1997 *Noise management and land use planning for helicopter landing areas*. Those standards require assessment of noise contours from aircraft approaching to land or departing a landing area, where such activities are close to sensitive land uses. Given the remote location of the application site from sensitive land uses, I consider that such assessment is not necessary for this proposal.

- **Submissions**

67. A number of submitters have opposed the application on grounds of noise. I consider that their concerns will be addressed by the assessment presented in this evidence, and on that basis, effects on any of the submitters or any other person will be less than minor. I understand that the submission of Stuart Camp, Director of Marshall day Acoustics which opposed the application only on grounds of technical issues relating to the noise assessment has now been withdrawn.

- **Officer report**

68. For the reasons set out in this evidence, I agree with the conclusions of the Council's officers that the activity will comply with the noise limits for the Rural 2 zone in the TRMP. However referring to paragraph 19 of this evidence, I recommend that the wording of draft condition 3 for the principal consent RM100848 should be amended to be consistent with the wording of rule 17.6.2.1(d).
69. I note that draft consent condition 14 for RM100874 for Earthworks and Land recontouring controls the operation of machinery by L10 and Lmax limits applied at the notional boundary of any adjacent dwelling. As noise from such equipment is considerably less noisy than the proposed motorsport activities, I consider that construction noise will easily comply with those limits and will not be audible at any dwelling.

CONCLUSIONS

70. For the reasons set out in this evidence, I am satisfied that noise emitted from the application site will be attenuated by distances to sensitive land uses, and by physical shielding by natural features, so that noise levels received at any sensitive locations would comply with the noise limits of the Tasman Resource Management Plan and would be consistent with accepted guidelines for the protection of sleep, health and amenity.
71. On this basis, I consider that noise generated by the activity would be consistent with the amenity of the local environment and would have less than minor effect on any other property.
72. Noise from road traffic associated with the activity will generally be within guideline limits for residential amenity and sleep protection, under New Zealand standards. Noise from the unsealed road and occasional large events may not be consistent with those limits, although for short periods of time. This effect is not unusual with large recreational facilities.
73. For the reasons explained in paragraphs 18 and 19 of this evidence, I consider that the Council Officers' proposed condition 3 should read:
3. *Noise measured at or within the notional boundary of any dwelling on any adjacent site in a rural zone, or at or within the boundary of any site within the residential zone shall not exceed the following limits:*

	Day	Night
Leq	55 dBA	40 dBA
Lmax		70 dBA

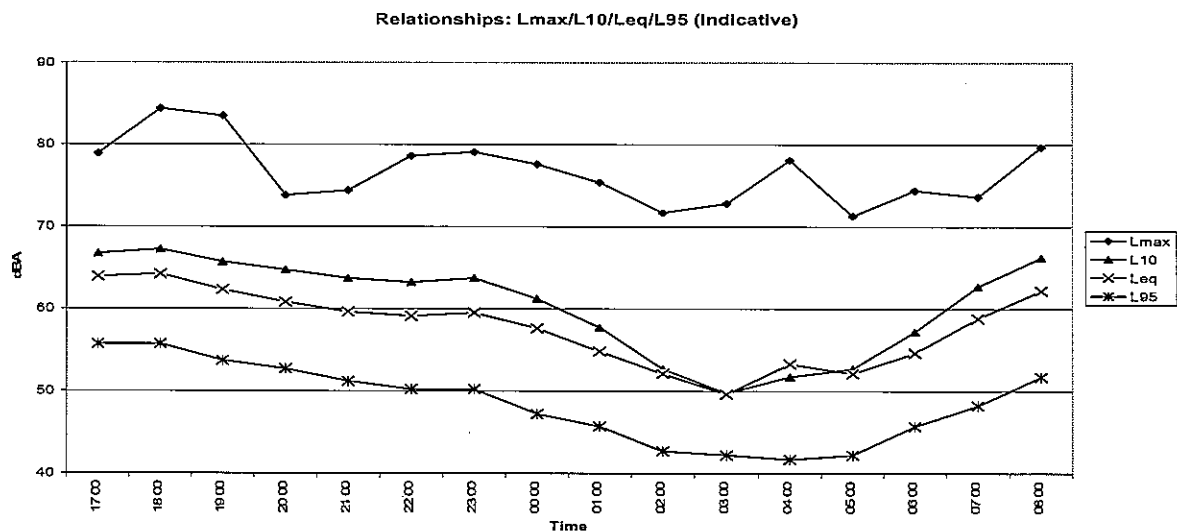
- *For the purpose of condition 3:*
- *Day = 7.00 am to 9.00 pm Monday to Friday inclusive and 7.00 am to 6.00 pm Saturday (but excluding public holidays).*
- *Night = All other times, plus public holidays.*
- *Noise shall be measured and assessed in accordance with the provisions of NZS 6801:2008 Acoustics - Measurement of Environmental Sound and NZS 6802:2008 Acoustics - Environmental Noise.*
- *“Notional Boundary” means:*
 - (a) a line 20 metres from the façade of any rural dwelling that is most exposed to the noise source; or*
 - (b) the legal boundary of the site of the dwelling, where this is closer to the dwelling than (a).*

ATTACHMENT 1

EXPLANATORY INFORMATION - NOISE TERMINOLOGY

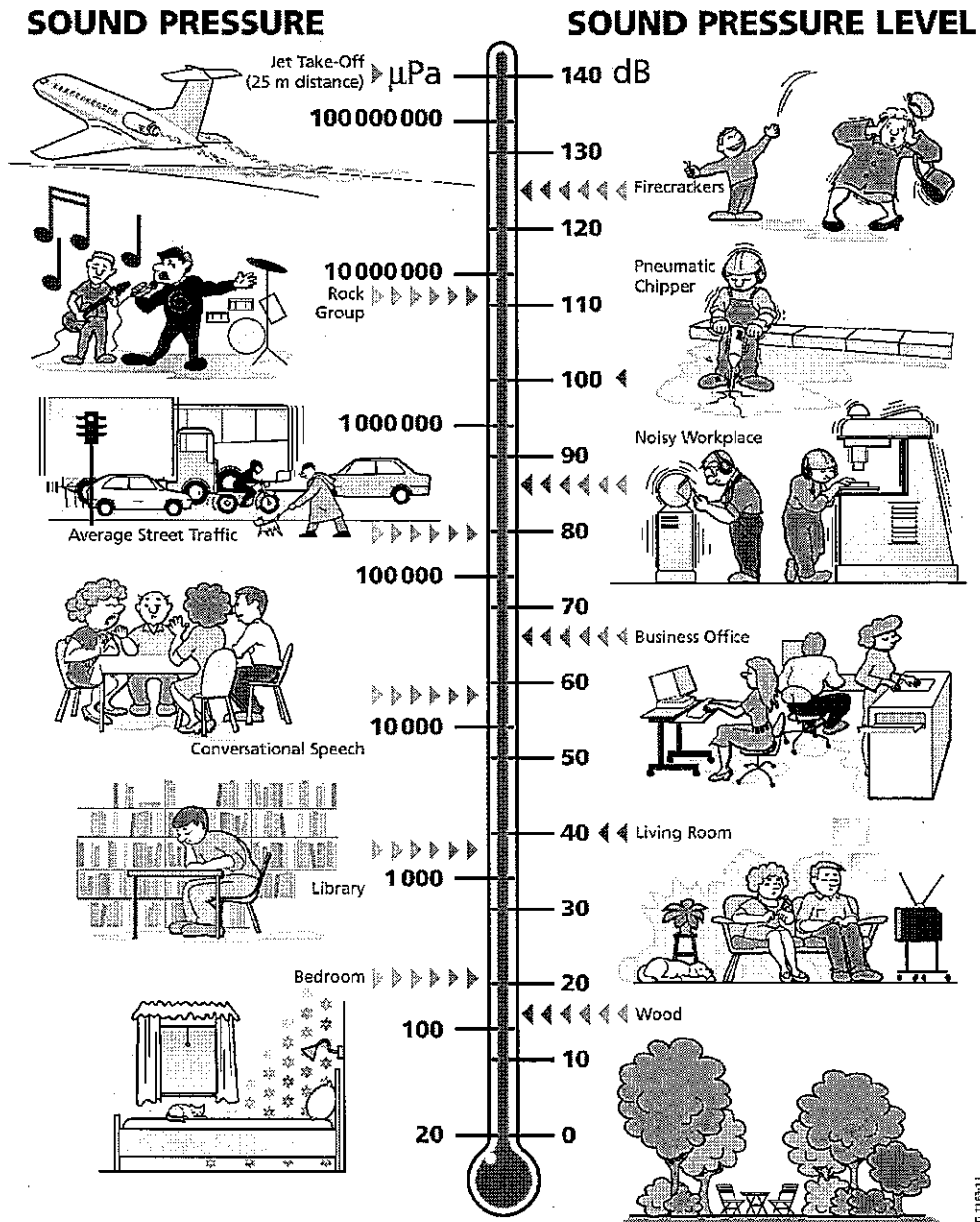
- NZS 6801 and 6802:2008 are New Zealand standards referenced in the Plan rules. They represent current best practice to be adopted in District Plans and consent decisions, and have replaced earlier terminology for noise metrics to make them consistent with international standards and practice. In the following definitions, the new terminology is shown within brackets.
- Decibels (dB) are descriptors used in sound measurements.
- dBA means decibels "A-weighted"; i.e. decibels adjusted to approximate human hearing response.
- dBA Lmax (dB L_{AFmax}) is the highest level heard in the measurement period
- dBA L10 (dB L_{AF10}), is the 10 percentile level, which indicates the most frequently occurring louder, but not loudest, sounds heard during the measurement period.
- dBA Leq (dB L_{Aeq}) is a single figure which contains the equivalent energy of all the varying sounds recorded in the measurement period
- dBA SEL (dB L_{AE}) or Sound Exposure Level is the 1-second equivalent level which contains the same sound energy as is received during a given noise event
- dBA L95 (dB L_{AF95}) or the 95 percentile level, indicates the background sound level.
- 'Ambient noise' is a term generally used for all noises that are present on an occasion of monitoring, whether or not the noise under assessment is present.

The following chart indicates the relationship between Lmax, L10, L95 and Leq measurements in an environment where traffic noise is the principal noise source.



BRUEL AND KJAER SOUND LEVEL CHART

This chart illustrates levels of noise from common sources

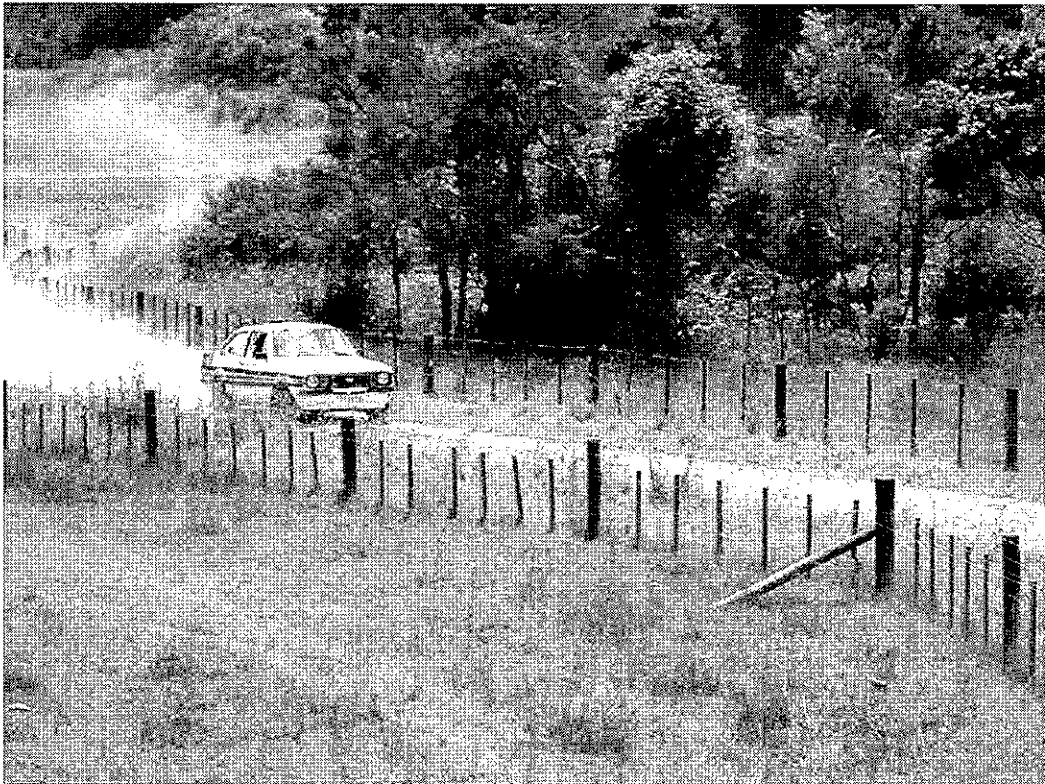


PHOTOS OF DRAG CAR AND RALLY CARS AT THE APPLICATION SITE

22 DECEMBER 2011

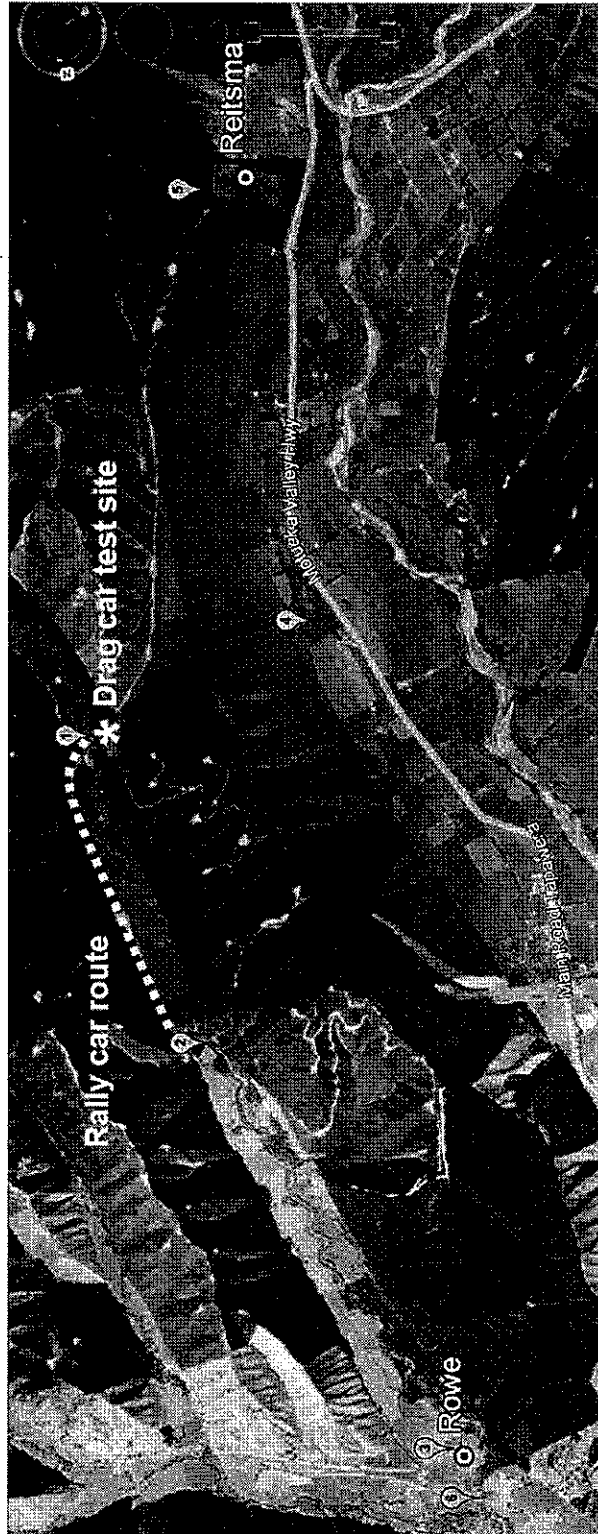


Rally cars on Stanley Brook Rd near Site 1



ATTACHMENT 3

TEST SITES, MONITORING SITES AND SUBMITTERS' PROPERTIES



ATTACHMENT 4
MARSHALL DAY ACOUSTICS REPORT

28 February 2012

Adcock and Donaldson Properties Ltd
68 Whites Road
Hope 7020

Attention: Gary Adcock

Dear Gary,

STANLEY BROOK REGIONAL MOTORSPORT PARK NOISE MODEL

Marshall Day has undertaken noise modelling of the Stanley Brook Regional Motorsport Park. This letter summarises the details of the modelling process used to produce the noise contours.

These contours are intended as an appendix to the Assessment of Noise Effects Report. They do not constitute an assessment of noise effects.

NOISE MODELLING SOFTWARE

We have used the internationally recognised noise modelling software, SoundPLAN, to predict noise emissions from the site. Each noise source is located on a 3-dimensional map and the software then calculates the noise levels at specified locations, allowing for ground attenuation, reflections, and screening.

The noise level predictions in SoundPLAN have been conducted in accordance with *ISO9613-2:1996 Acoustics - Attenuation of sound outdoors - Part 2: General method of calculation*.

SITE LAYOUT AND TERRAIN

The location and layout of the noise sources is based on the drawings included with the resource consent application; specifically drawings RC02 - RC07 dated 22-11-2012.

The surrounding terrain was modeled using Land Information New Zealand 20m contours available from the Koordinates website (www.koordinates.co.nz). Given the scale of the activity and separation distances, we consider this to be an acceptable level of accuracy.

SCALE OF ACTIVITIES

We have modeled noise from the Drag Strip, Motocross Track, Off-Road Racing Track and the Rally Road. We have predicted the noise levels from each of these areas individually, and also calculated the overall cumulative noise level. The details of the activities modeled in each area are as follows:

Drag Strip

Large drag racing events typically have a number of races for a variety of vehicle classes. The noise level generated during a race depends on the class of vehicle racing.

We have modeled noise levels from the drag strip based on measurement of the loudest vehicle class, and thus consider the predicted noise levels from drag events to be a worst-case.

Motocross Track

Marshall Day Acoustics has previously undertaken detailed measurements of motocross bikes under racing conditions. Noise levels from 75cc, 250cc, 450cc and peewee motorbikes were measured.

We have modeled noise levels from the motocross track assuming that the loudest motorcycle class is active and under full race conditions

Off-Road Racing Track

The Off-Road Racing Track can be used by a very wide range of vehicles, from quad bikes to Class 1 racing buggies.

We have modeled noise levels from the off-road racing track assuming that a field of off-road V8 vehicles is under full race conditions.

Rally Road

The Rally Road may be used by a very wide range of vehicles including off-road buggies, super motard bikes, quad bikes, rally and rally-cross cars, and motocross bikes. Of these the V8 off-road vehicles are the noisiest.

We have modeled noise levels from the rally road assuming that it is being used for racing by off-road V8 vehicles.

SOURCE NOISE LEVELS

Based on measured noise levels at a number of different locations and conditions around New Zealand, we have based our calculations on the following indicative noise levels:

Table 1: Source noise levels

Source	Measured Sound Level	Measurement Position
Drag Racing	85 dB L_{Aeq}	150m from start line, 35° off axis, behind start
Motocross	78 dB L_{Aeq}	44m from sharp corner
V8 Vehicles	75 dB L_{Aeq}	81m from medium corner after straight

SCENARIOS

We have predicted noise levels from the activities above in a number of configurations. These are:

Figure 1: Drag Racing Only

Average noise levels during a major drag racing event, with no other motorsport activities operating.

Figure 2: Motocross Racing Only

Average noise levels during a motocross event on the motocross track, with no other motorsport activities operating.

Figure 3: Off-Road Racing Including Rally Track

Average noise levels during an off-road racing event using both the off-road track and the rally track, with no other motorsport activities operating.

Figure 4: Cumulative Noise Levels

The cumulative noise levels during a major drag racing event, motocross racing, and off-road racing on both the off-road track and rally track.

DISCUSSION

1. Noise levels from motorsport are very intermittent, and as such we have used short-term average (L_{Aeq}) levels for our assessment. The noise levels predicted are therefore an indication of the noise levels during racing. The average (L_{Aeq}) noise levels over the course of an hour or a day will be lower than the contours suggest.
2. Our measured noise levels for Motocross racing correlate to the maximum noise levels specified in the Motorcycling New Zealand *Manual of Motorcycle Sport*, and thus can be considered worst-case.
3. Drag racing is unique in motorsport in that the difference between L_{Aeq} and L_{AFmax} noise levels differs significantly. Noise levels as high as 102dB L_{AFmax} @ 150m have been recorded during Drag Racing. Given that these elevated noise levels can occur for a number of seconds, the potential effects may need to be considered.
4. We have not considered noise from Kart Racing or track events on the circuit. The worst-case event for the track circuit would have similar noise levels to the V8's measured. Given the location of the circuit, noise levels at dwellings would be lower than for the rally road/off-road track situation. Noise levels from Karts will be even lower.
5. We have not considered noise from outdoor concerts. We understand that these will be on a scale similar to a "vineyard" concert, and noise levels will be much lower than might be generated by motorsport activities.

We trust this information is satisfactory. If you have any further questions please do not hesitate to contact us.

Yours faithfully

MARSHALL DAY ACOUSTICS LTD



Robbie Blakelock
Consultant



Noise level
dB LAeq

[Lightest gray swatch]	= 30
[Light gray swatch]	= 35
[Medium-light gray swatch]	= 40
[Medium gray swatch]	= 45
[Medium-dark gray swatch]	= 50
[Dark gray swatch]	= 55
[Darkest gray swatch]	= 60
[Black swatch]	= 65

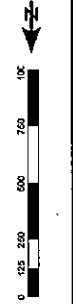


Figure 1

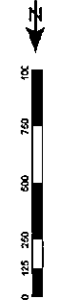
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 Filename: Drag Racing Leg Result: Calibration of Drag Strip
 Prepared by: RMB Date: 27/2/2012

Figure 2



Noise level
dB LAeq

30	35	40	45	50	55	60	65
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Client: Atcock and Donaldson Properties, Ltd
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Prepared by: RMB Date: 27/2012



Figure 4

Client: Adcock and Donaldson Properties Ltd
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 Prepared by: RWB Date: 2/7/2012