IN THE MATTER OF The Resource Management Act 1991

AND

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

EVIDENCE OF FIONA ANNE AMBURY

ENVIRONMENTAL ENGINEER

PATTLE DELAMORE PARTNERS LTD

1 March 2012

INTRODUCTION

1. My name is Fiona Anne Ambury. I hold the qualification of Bachelor of Engineering (Natural Resources) from the University of Canterbury. Since 2000 I have been employed as an Environmental Engineer with Pattle Delamore Partners Ltd, an environmental consulting firm specialising in water resources. I have a total of nearly 12 years of engineering and environmental consulting experience.

2. I have been involved in a number of assessments of rainfall data for a variety of uses, including the harvest of roof water for potable supply. This work has involved reviewing the appropriateness of the rainfall data available, reviewing the impact of climate change on the assessment, assessing water supply requirements and calculating storage requirements.

3. I have read (and am familiar with) the Code of Conduct for Expert Witnesses and I confirm that this statement of evidence (and any oral evidence I may give in the course of this hearing will) be in accord with that code of practice.

4. I have been engaged by the Applicant, Adcock & Donaldson Properties Limited to provide advice on the availability of rainwater and bore water to meet the potable water supply needs of the development.

OUTLINE OF EVIDENCE

5. My evidence will cover the following areas:

   - An outline of the water requirements
   - A description of the rainfall data and effects of climate change.
   - An assessment of the availability of water for potable supply.

Potable Water Demand

6. It is proposed to meet the on-site potable water supply by harvesting roofwater and supplementing this with bore water. It is acknowledged that during events there will be a substantially higher demand for water than during non-event periods. This will be catered for by providing storage tanks.

7. The design water demand needs to meet the supply required by both the permanent residents and routine weekly users of the development and the increased demand that occurs during large events.

8. As with the wastewater assessment presented by Mr Andrew Dakers, I have assumed that portaloos will be used for large events. I have also assumed that these will be delivered to the site with a

supply of water for washing hands. Therefore, they will not require any water from the site's potable supply.

9. Table 1 presents the water requirements for the various activities and buildings proposed for the development. I have been advised by the applicant that the potable supply will not be used for irrigation purposes. Therefore, the water requirement values are the same as those used in the wastewater assessment by Mr Andrew Dakers.

Table 1. Design Water Demand (assumes portaloos used for large events)

Activity	Facility	Estimated design daily patronage	Water vol/patron L/day	Daily water vol (L)
Motor Cross Lake activities	Ablution block 1	50	20	1,000
Supermoto area	Ablution block 2	50	20	1,000
Off road	Ablution block 3	50	20	1,000
Rally road	Ablution block 4	40	20	800
Club room pit area	Ablution block 5	40	50	2,000
Drag strip	Ablution block 6, 7 and 8	200	20	4,000
Kids pee wee area	Ablution block 9	40	20	800
Confidence course	Ablution block 10	40	20	800
Luge area	Ablution block 11	60	20	1,200
Commercial Area (including conference centre)		200	40	8,000
Accommodation, 96 beds	Full facilities	100	200	20,000
Camping ground	Full facilities	60	120	7,200
Caretakers house	Full facilities	5	200	1,000
		Total daily demand (L/day)		48,800

10. The peak water demand is assumed to occur 60 days per year coinciding with the major events occurring at the park. These events have been assumed to be made up of 1 – 3 consecutive days, for example, from one day a weekend to entire holiday weekends.

11. The minimum weekly demand is expected to comprise the caretakers house and some use of the facilities by local clubs and day visitors. These weekly visitor numbers are expected to be relatively low and I have assumed that they would result in a water demand of up to 1,000 L per day.

12. There is a proposed conference centre that can cater for up to 200 people and this is likely to be used during the week. The peak water demand for this is assumed to be 8,000 L per day.

Water Availability

13. The water supply will comprise harvested rainwater and bore water. The availability of these two sources of water are summarised in the following paragraphs.

Bore Water Supply

14. The water supply sourced from bore water will be provided by the maximum permitted bore water take for the Upper Motueka Zone. Rule 31.1.2.1 of the Tasman Regional Council Regional Plan allows a maximum permitted quantity of 10 m^3 of water, per day, per point of take, per site. I have been advised that there are two legal titles for the development site and therefore, the total permitted allocation for the development would be 20 m^3/day.

Rain Water Supply

15. Daily rainfall data for the assessment was sourced from the Tapawera 2 weather station, which is located approximately 2 km west of the site and has been active since August 1992. I consider it to represent an appropriate rainfall data set for the site. Table 2 outlines the average and minimum monthly and annual rainfalls for this weather station.

Table 2. Average and Minimum Rainfall Data (mm)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Anr
Average	69.8	58.4	64.2	81.2	109.0	120.6	89.5	100.6	93.4	110.8	84.0	89.4	
Minimum	15.0	1.1	2.6	12.2	5.8	64.0	9.4	13.2	15.9	33.4	5.7	22.8	

16. A review of the Tapawera 2 rainfall data found that the longest dry period (period between rainfalls) was 32 days.

17. The projected influence of Climate Change on rainfall in the Nelson-Tasman area has been explored in the Ministry for the Environment Document titled "Climate Change effects and Impacts Assessment – A Guidance Manual for Local Government in New Zealand". This identifies the projected changes for selected stations within each regional council area in seasonal and annual precipitation in (%) from 1990 to 2040. The results for the Tasman-Nelson Region, at the Nelson Site reveals a Summer, Autumn, Winter and Spring seasonal percentage increases of 4%, 5%, 1% and 0% respectively. This report does not predict a decrease in seasonal rainfall. Therefore sizing the water supply system based on current levels will be adequate for the future.

Water Storage Requirements to Meet Demand

18. A review of the weekly rainfall was undertaken to assess the available volume of water when all of the proposed development roof area is used for storage under the following two scenarios:

    - Dry conditions, which looked at the twenty percentile weekly data. This is considered to represent the 1 in 5 year dry conditions.
    - Average weekly data.

19. An allowance was made for the rainfall lost due to use of first flush diverters.

20. This data was plotted along with the demand under the following scenarios:

    - A one day event with a peak load of 48.8 m^3/day and six days under low load of 1 m^3/day for the caretakers house and 1 m^3/day for day visitors. Total weekly volume demand of 60.8 m^3.
    - A two day event with a peak load of 48.8 m^3/day and five days under low load of 1 m^3/day for the caretakers house and 1 m^3/day for day visitors. Total weekly volume demand of 107.6 m^3.
    - A three day event with a peak load of 48.8 m^3/day and four days under low load of 1 m^3/day for the caretakers house and 1 m^3/day for day visitors. Total weekly volume demand of 154.4 m^3.

21. Figure 1 attached to my evidence shows that during dry conditions rainfall alone will generally not meet the demand for major events, even if it is only for a single day within a week.

22. Figure 2 attached to my evidence shows that during average conditions, rainfall will, with the exception of two weeks, meet the requirements for weekend with a single day major event, and will meet the requirements for a two day major event for more than half of the year.

23. The development will have access to 20 m^3/day of ground water. The maximum weekly amount of water that could be stored using bore water is therefore 140 m^3. This is slightly less than estimated peak weekly load of 154.4 m^3 when there is a major event for three days and no major event, for example a conference, during the week.

24. I would recommend that at least 160 m^3 of storage is provided on-site. This is enough storage to cater for a week with a three day major event. But there may not be enough storage if the previous weekend also held a major event of two days or more, or if there had been a large conference during the week.

25. Therefore, the site will need to develop a water management plan to ensure that adequate water will be available for large events. This will need to include forward planning if it looks like they may have a shortage of water. One option is to truck potable water to the site to fill the on-site storage tanks.

26. Having considered the above and the analysis undertaken I am satisfied that all water requirements can be provided making use of permitted rates of extraction, rain water collection, storage and

tanker top up if required. There is no reason why in technical or practical terms a scheme cannot be designed and commissioned to meet all required outcomes.