

**IN THE MATTER OF**

the Resource Management Act  
1991

**AND**

**IN THE MATTER OF**

applications by Central Plains Water  
Trust to:

Canterbury Regional Council for  
resource consents to take and use  
water from the Waimakariri and  
Rakaia Rivers and for all associated  
consents required for the  
construction and operation of the  
Central Plains Water Enhancement  
Scheme

Selwyn District Council for resource  
consents to construct and operate  
the Central Plains Water  
Enhancement Scheme

**AND**

**IN THE MATTER OF**

a notice of requirement by Central  
Plains Water Limited to:

Selwyn District Council for the  
designation of land for works  
associated with the construction and  
operation of the Central Plains  
Water Enhancement Scheme

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**THIRD BRIEF OF EVIDENCE OF JOHN WILLIAM DONKERS**

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1. My full name is John William Donkers.
2. I have previously provided two briefs of evidence for this hearing in which I set out my qualifications and experience.
3. I would also like to reiterate that I am a farmer with a farming business that is absolutely reliant on irrigation. Unlike many of the submitters, whose irrigation experience is theoretical, my irrigation experience has been at the "coal face" where the consequences of poor irrigation development or unreliable water supply can be catastrophic. This is true for my own farm investment and for the clients I service in my role as a consultant.
4. I am providing this evidence in my capacity as a director of Central Plains Water Limited to respond to several matters which have been raised by submitters against the proposed CPW Scheme, namely that: -
  - i) The planned level of supply reliability of 97-98% being sought for the CPW Scheme is excessive and that lower supply reliability as occurs in other schemes would be adequate for CPW.
  - ii) A viable alternative irrigation scheme to the CPW scheme, is a run-of-river scheme backed up by supply from groundwater.
  - iii) There is no such thing as unreliable groundwater only unreliable infrastructure that pumps groundwater.

## **Supply Reliability**

5. I have been involved in development of the CPW Scheme since its inception in 2000. Throughout the process I have been a strong advocate for designing and consenting a scheme with a high level of supply reliability. This advocacy stems not only from my own experience but from my work with irrigated farmers in Canterbury, who increasingly strive to improve the reliability of their water supply and the efficiency with which they use water. Irrigators are investing significant additional capital to increase reliability and efficiency.
6. I make no apology for this. The CPW Scheme is has been designed as a 21<sup>st</sup> century scheme and is reflective of the level of reliability being sought by farmers doing business in the 21<sup>st</sup> century. Comparisons with older schemes or schemes designed on the basis of older schemes miss the point of the CPW proposal.

7. The claim that farmers with access to irrigation water of high reliability use water less efficiently than if the water is of lower reliability is wrong. In fact the opposite is true.
8. Access to water of high reliability allows efficient irrigation planning. It enables farmers to capture more of the benefit of rainfall, particularly on the shoulders of the irrigation season (September-October and March-April) by running at lower soil moisture levels.
9. In dry seasons this might not be possible and irrigation water use will be high. During seasons of higher rainfall the result will be lower irrigation water use, with the unused water remaining in the environment.
10. Application efficiency is reduced where supply reliability is lower. This occurs because farmers will take water when it is available to maximise soil moisture levels, to offset the risk of water not being available in future. The result is potential over-watering and reduced benefit from rainfall.
11. In his evidence Edwin Jansen argues that the economic benefit to the region would be greater if irrigation water were allocated more widely, albeit at lower levels of reliability. Jansen also infers (refer section 6.10-6.20 of his evidence) that irrigation schemes relying on A permit water such as the Waimakariri Irrigation Scheme operate on a sufficient level of reliability to sustain modern farming.
12. I dispute this inference. I work as a dairy farm consultant and I have a number of dairy farmer clients who irrigate their properties with water supplied by Waimakariri Irrigation Ltd. (WIL). By way of a case study I want to demonstrate the impact of lower reliability water supply on a particular client's dairy farming business in the 2006/07 season.
13. Botany Farms Ltd. was (the farm has recently been sold) a 370 effective hectare dairy farm, milking approximately 1,100 cows in the 2006/07 season (2.97 cows/ha). Soils are Lismore stony silt loam. The farm was irrigated by five rotating boom irrigators with an 11-day return period. The farm was developed with irrigation and converted to a dairy farm in 2001. The farm had sufficient WIL shares to irrigate 100% of the effective farm area. The farm had access to 160 hectares of support land located nearby, 130 hectares of this was irrigated by a centre pivot irrigator also from the WIL scheme. The support land provided feed and grazing for replacement livestock, some supplementary feed for milking cows and winter grazing for about half the milking cows.
14. The business set a relatively conservative production target of approximately 400,000kg of milksolids for the 2006/07 dairy season. At the end of December 2006 (about the halfway point of the season) the farm was on target to achieve this target with milksolids production slightly above 200,000kg.

15. Achievement of the forecast production was very dependent on the reliability of irrigation water supply. The Farm Managers reports record that water supply ceased on 17<sup>th</sup> February 2007 with no further supply in February (supply reliability for the month of 61%). Water supply in March comprised only 7 days (supply reliability of 23%).
16. The impact of this low level of reliability on the farm was significant.
  - Final milksolids production for the season was approximately 372,000kg - 28,000kg short of a reasonable target. The milk price for that season was \$4.59/kgMS, reducing income by \$128,000.
  - In an attempt to maintain production, cow bodyweight and pasture cover and to ensure adequate feed for the following season the farm purchased an additional 200 tonnes (drymatter) of maize silage. This cost \$40,000.
  - Feed on the support land was used to feed milking cows in March and April. This was only possible by grazing the 230 replacement heifers off farm for 12 weeks. This cost approximately \$20,000.
  - The dry autumn conditions following a relatively wet spring proved ideal for grassgrub and large areas of pasture farm were severely damaged by the insects. This was some of the worst grassgrub damage I have ever seen. Pastured paddocks resembled having been partially cultivated using discs or a grubber. Irrigated pastures that can also be fertilised with nitrogenous fertiliser are able to withstand a significant insect challenge and still produce adequate pasture feed supplies. The severity of the damage necessitated the repasturing of approximately 100 hectares in late autumn and the following spring. This cost a further \$20,000.
17. The direct financial cost to Botany was approximately \$208,000.
18. After an equally difficult autumn in 2006, with significant water supply restrictions Botany made several changes to the way it operated its dairy farming business to mitigate the impact of the relatively low reliability of WIL water supply, which occurs predominantly from January to April. These changes involved purchasing more supplementary feed than it had done previously and growing 20ha of brassica crops to supplement the supply of pasture. These strategies added extra costs to the business.
19. The effect of restricted water supply isn't just confined to the season in which it occurs. The effects are often felt in the following and subsequent seasons and include: -
  - Reduced winter pasture production due to lower autumn pasture cover and the impact of insect damage - mainly grassgrub, but also porina and argentine stem weevil.

- Increased annual weed infestation, particularly nodding thistle, due to more open pastures.
- Increased prevalence of pasture grass weeds, particularly rhizomatise grasses such as browntop and couch. These species are persistent and are much less productive than ryegrass and other beneficial pasture grasses. Both the quantity and quality of feed produced from pastures with significant infestations of these grasses is much reduced

20. If this were a one in ten year event farmers would probably live with the situation. Unfortunately in the previous season (2005/06) a similar situation occurred and last season (2007/08) water supply was either restricted or completely shut off for most of March and April. The situation last season was helped by a significant rainfall event in mid February but the outcome was again similar to 2006/07.
21. Obviously the effects of the relatively low supply reliability were making the owners of Botany Farm look at their options for enhancing reliability. They had scoped out a plan to build a large storage pond and switch from rotary boom irrigators to centre pivot irrigation. The proposed plan had a price tag of \$750,000 and would have covered only 300 hectares of the 370 hectares of effective land; a per hectare capital cost of \$2,500. The redevelopment of the irrigation system was likely to have cost more than the original irrigation development in 2001. (I believe the new owners of the property are proceeding with the irrigation redevelopment).
22. Even then the increase in reliability is only marginal, with the storage pond only providing enough water to irrigate 300 hectares with about 50mm of water (15-20 days supply in March).
23. This sort of investment by farmers to improve irrigation supply reliability is not unique and is happening throughout New Zealand. Enhancement initiatives include:
- The upgrade of older type border dyke irrigation (contour) with wide borders and laser levelled borders.
  - Redeveloping contour irrigation with spray irrigation (mainly centre pivot irrigators).
  - The installation of on farm storage ponds.
  - The piping of previously open race supply channels and as a consequence the pressurisation of the supply reducing electricity costs.
  - The deepening of bores from which groundwater is extracted.
  - Community storage schemes to boost the reliability of supply within small catchments.

- The increased use of soil moisture monitoring technologies, small weather stations and computer software to make improved irrigation decisions.

## **Groundwater as a Backup Supply**

24. Synlait presented evidence to the Hearing suggesting a viable and reliable alternative scheme could be a run-of river supply backed up by groundwater. On the face of it this seems a credible option but there are significant limitations to the viability of this option.
25. This is only likely to be an option for existing groundwater irrigators (such as many of the Synlait owned dairy farms) who already have the infrastructure in place to pump from groundwater.
26. In the current environment it is difficult to see a farmer who does not currently have a resource consent to take further groundwater being granted this right, as both the Rakaia-Selwyn and Waimakariri-Selwyn groundwater zones are considered to be fully allocated by Environment Canterbury.
27. In some parts of the upper Plains it simply isn't an option to access groundwater as it is not available in sufficient quantities or it is at depths that make it prohibitively expensive to extract.
28. Even if a non-irrigator got access to groundwater it is highly unlikely that they would invest in two sets of infrastructure to access water from both groundwater and from a surface supply. It is only a viable option for existing irrigators because the sunk cost they have in infrastructure to extract groundwater.
29. A bore to extract groundwater drilled to a depth of 200m, submersible pump, cabling, controls, piping and electricity connection would cost in the range \$250-300,000 and may not supply enough water to irrigate the same 150 hectares.
30. In comparison a reasonably sized surface pumping system capable of pumping water to say 150ha would require approximately 75kW of pump motor capacity. Power connection, pump controls, piping connections, suction screens and pump shed would cost approximately \$100,000.
31. This is a total capital investment of approximately \$400,000 (or \$2,670ha - 150ha). To this must be added scheme costs outside the farm gate such as intake structures, reticulation races etc. It is difficult to estimate these costs but it is conceivable that the cost of these components make this concept as capital intensive as the expensive as the CPW Scheme.

32. There is a considerable ongoing cost in maintaining and operating deep wells and large submersible pumps, which is unlikely to make this the cheap option that has been suggested.
33. For example the electricity network provider in the Central Plains area is Orion. Its current pricing policy for large irrigation connections is a fixed charge, which currently stands at about \$180/kW. The annual cost to have a pump with a nameplate rating of say 100kW connected to the network is \$18,000. This cost is incurred whether the pump is used or not.
34. A 300ha irrigated farm that I am involved with located at Te Pirita at 160 metres above seas level pumping from a pumped static level of approximately 100m has 390kW of nameplate rated pumping capacity. The annual fixed network charges for this property are \$70,000 or \$234/ha. Energy costs are additional to this.
35. I can't see a way that groundwater infrastructure could be utilised to pump the surface water supply. Consequently, surface water pumping infrastructure will have to be a separate and dedicated system, albeit that the pump capacity will be significantly less than that of the groundwater system. Under the current Orion pricing model the surface pump would also incur the fixed network charge, although changes to the pricing model could see the charge levied only on the larger pump if the two pumps were supplied through the same connection and only one pump were operated at any one time.
36. If an irrigation scheme based on run of river surface supply backed up by groundwater is to be sustainable in the long run then all this infrastructure needs to be maintained. Depreciation costs also increase for such a system.
37. A large submersible pump (say 100kW) can cost \$50,000. Lifting and lowering a pump from depth can take a day and cost several thousand dollars.
38. As I have previously stated my farming business is heavily reliant on groundwater to supply our irrigation requirements. Groundwater has been a relatively reliable and cost effective supply option but this has changed in recent years and there are further threats to the viability of the groundwater supply and cost of its extraction, particularly on the upper plains.
39. Like many other groundwater irrigators in our area, we strongly support the CPW Scheme concept because it offers us a highly reliable supply with less risk. We are aware that it will be a relatively expensive option but not necessarily that much more expensive than our present supply option. The concerns around groundwater reliability and support for the scheme are reinforced by the recent survey of CPWL shareholders as reported by Mark Mabin.

40. It should be noted that having a large group of incumbent irrigators supporting a community irrigation scheme is a relatively unique situation. In many other areas of Canterbury where there are proposals to expand and enhance access to water existing irrigators have often not been supportive to the detriment of the wider community.
41. Many submitters have questioned the rationale for existing irrigators supporting the CPW Scheme. The reality is that they have been strong supporters in the past and continue to strongly support the concept.
42. However, this support is very dependent on the reliability of supply of the CPW Scheme. If the reliability of supply is not able to better existing groundwater reliability then existing irrigators are unlikely to continue to support the Scheme.
43. If the CPW Scheme can offer a high level of supply reliability I do not believe CPWL shareholders with existing groundwater irrigation will continue to maintain groundwater infrastructure as a backup system or operate as some type of hybrid scheme. The cost of maintaining and operating this infrastructure is likely to be prohibitively expensive.

## **Reliability of Groundwater**

44. An oral comment by Mr Ford in his presentation of his section 42A report suggesting that there was no such thing as unreliable groundwater shows how little some people understand about the groundwater system and how irrigation works.
45. Using a case study example of one of our farms at Te Pirita I want to highlight how variations in groundwater over time affects supply reliability and the costs involved in maintaining a reliable water supply from groundwater.
46. Irrigation development of this property began with the drilling of three bores in 1998 and 2000. The bores (300mm steel casings) were drilled to depths ranging from 110-140m. The yields from the three bores varied considerably with the best bore (the shallowest) test pumped at approximately 100 litres/second in 1998.
47. We took the bore logs to our irrigation supplier who designed an irrigation system based on the information on these logs, which took into account details such as the yield (based on pump test results) and static water levels - before and during pump testing.
48. The irrigation system was installed in 1999 and operated efficiently until 2004, when we started to experience problems with reduced water supply in the bores. This was manifest as reduced inflow into the bore and lower static water levels, the result of the cumulative

impact of irrigation development from groundwater in the Te Pirita area and reduced rainfall recharge.

49. The reduced flow into the bores and the lower static water level meant the installed submersible pumps designed to operate at a certain static water level were now required to lift water from greater depth and as a consequence pumping efficiency declined i.e. less water was pumped and reliability of supply was compromised.
50. Supply reliability continued to decline from 2004 and to improve supply a bore was deepened in 2006 and we are currently in the process of deepening a second bore.
51. At the time the bores were originally installed barely 10 years ago they were state of the art - large diameter (300mm steel casing) drilled relatively deep >100m. Improvements in technology since 2000 now enabled well drillers to drill to greater depths (>200m) with more confidence and this has become the norm on the upper plains.
52. Deepening existing bores is not always possible and is a costly exercise. The bore we are currently upgrading is 300mm steel casing and will be difficult to push down to 200m. Drillers now going to depths greater than about 150 metres start with a 400mm casing down to about 100m and then drill deeper with a 300mm casing. As a consequence we are drilling a new bore from scratch. At about \$600 per metre it will cost in excess of \$120,000.
53. The existing pump and controls will not be adequate for the new deeper bore. A larger pump will be required which will also require new cabling and new controls. Budgeted cost is approximately \$300,000 (approximately \$1,000/ha). This is significant capital expenditure that our business would preferred not to have spent but we are also acutely aware of the downside of reduced supply reliability as described in the Botany case study. Without this investment there was a risk that we could be in the situation that Botany Farm was in, in 2007.
54. The cost of operating the system will also increase.
55. Groundwater systems are very dynamic and our understanding of the factors that influence groundwater levels still has some significant gaps. This is a risk to those farmers who have invested heavily to build their farming businesses on groundwater. The risks are accepted but this case study, which has been repeated on numerous other farms highlights how changes in groundwater levels over a relatively short time frame have impacted irrigators. It also highlights how quickly best practice and quality infrastructure can become less efficient or even redundant.

**John William Donkers**