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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BRIEF OF EVIDENCE OF ANDREW WEBSTER MACFARLANE

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Qualifications and experience

1 My full name is Andrew Webster Macfarlane.

2 I graduated from Lincoln College in 1981 with a Bachelor of Agricultural Science degree. I have 29 years experience as a Farm Management Consultant, 28 of which have been in private practice. I am a registered member of the New Zealand Institute of Primary Industry Management and am the current New Zealand President of that Institute.

3 I have been farming on my own account, with both border-dyke and spray irrigation, for 20 years. My home property was awarded the ñBallance Farm Environment Awardò (for setting a high standard in environmentally sustainable farming) in 2003.

4 My advisory work involves crop and animal systems, the impact of soil fertility and water availability on them, and the financial analysis of such systems. I have been advising farmers on management of their border-dyke and spray irrigation schemes for 28 years. In recent years a significant amount of my time has been involved in assisting farmers:

- Re-develop existing irrigated areas (both spray and border-dyke) to enhance efficiency of resource use and hence profitability.
- Develop sound design and management practices for proposed water use, both individual and group schemes.
- Manage production and financial risk around water enhancement schemes, both group and individual.

5 I have read the code of conduct for expert witnesses in the Environment Court practice note, and confirm that I have complied with the code in the preparation of my evidence. I will comply with that code when giving this evidence.

Scope of Evidence

6 I have been requested to update my evidence concerning on farm economics resulting from the Central Plains scheme.

7 Key changes to assumptions in my 2007 evidence include:

7.1 Waianiwaniwa storage of about 4,500m^3/ha is no longer available. Monthly reliability is reduced to that shown in Table 1. (supplied by URS)

7.2 Table 1 shows, as the blue line (bottom) monthly reliability with no storage, with each of the line above showing reliability with 500, 1,000 and 1,500 m^3 of storage. 1,000m^3/ha storage creates reliable water in December, 1,500m^3/ha creates enough reliability in January for mixed or arable systems. Reliability in Feb/March is inadequate for dairying unless high input supplementary feed systems are employed. To mitigate that poor reliability, use of existing wells would be required.

7.3 I have examined the reliability data and believe that for farmers with no wells, on farm storage of 1,500m^3/ha is the practical upper economic limit. On a 260ha property, 390,000 m^3 of water would be stored in an earth dam of 13 ha, 10m deep. The best option will depend on farm layout, soils and economics, but a \$1.50 to \$5/m^3 (lined, deep dams) stored, is significantly more expensive than off farm storage options on a cost per m^3 basis.

7.4 Such storage would bring reliability up to adequate levels for mixed and arable land uses, but would still be limiting to dairy development, as a result of less predictable pasture growth in February/March.

7.5 In practical terms, once on restricted run-of-river supply, the three storage options described below will supply water for a time frame and quantity of:

Storage Capacity	Time @ 2mm/day top up	Time @ 4mm/day full supply
500m^3/ha (50mm)	25 days	12.5 days
1,000m^3/ha	50 days	25 days
1,500m^3/ha	75 days	37.5 days

Most farms, on run-of-river supply, would experience on an annual basis, a period of partial cuts (up to 60% of full supply) followed by a variable period of 100% cuts.

The storage demand will depend on the need for reliability in Jan/Feb/March.

Mixed arable systems with only some crops requiring February water will have a lower requirement than land uses requiring reliability through that 100 day summer/autumn period.

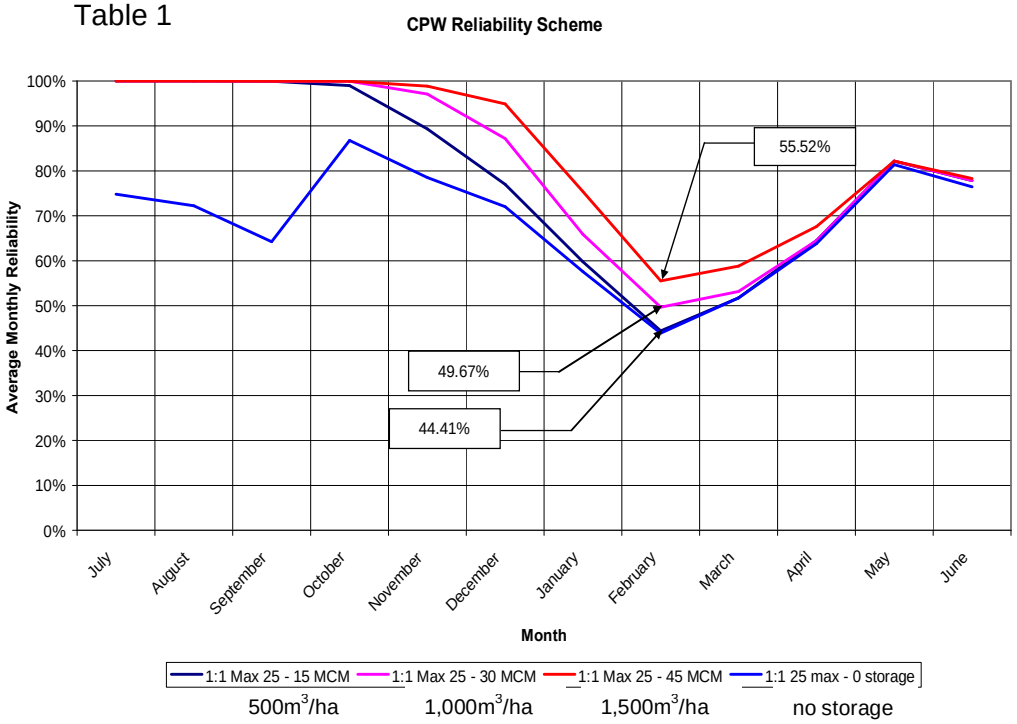
7.6 The speed with which farmers proceed to build on farm storage will depend on:

- likely off farm storage options
- the relative cost of those off farm options compared to on farm
- the time frame for off farm options to become available
- ability to mitigate reliability within a scheme by prioritising water to those farmers without well water.

Farmers will persevere with low reliability for up to five years. The less certain and less economic group storage options are, the quicker they will move to install on farm storage.

For some the likely compromise is lower capacity on farm storage to supplement a scaled down off farm storage option.

Table 1



8 For those properties with existing well infrastructure, access to that water resource will be needed for supply when river flow is constrained.

Therefore expect the total annual volume of underground take to be reduced, but on an unpredictable basis, requiring access to the underground water during any month after November.

9 My examination of the reliability data supplied by URS suggests that an approximate split of take for dual take farms will be 60% run of river, 40% underground.

Energy costs reflecting such a balance are budgeted.

10 The need to have the existing consented well water available for use (due to the unpredictability of the run of river flow) is likely to **reduce** the ability to reallocate that resource to new consents. In our 2007 evidence, we assumed 50% of the freed up well water could be re-allocated, as the scheme water was 97% reliable. Hence our total affected area reduces from 95,250ha to 76,000ha.

11 The result of the large changes in reliability, and hence type of infrastructure, is a significant change in land use from that projected in 2007.

The three types of land use dependent on very reliable February/March water, being dairy, intensive summer finishing, and process crops such as potatoes, have been predominantly restricted to farms with existing wells, where the unreliability in those months can be mitigated.

12 I summarise the assumed existing land use that was proposed under the original scheme, and that which is now likely:

	Pre scheme (ha)	*2007 assumptions (ha)*	*2009 assumptions (ha)*
Total affected area			
Dryland livestock	55,250		9,250
Mixed livestock/arable (50% water)		20,500	32,000
Mixed livestock/arable (100% water)	8,000		
Finishing livestock/arable		3,000	-
Dairy (100% water)	22,000	46,500	25,000
Arable and process crop		15,250	5,000
Arable/winter finishing		-	14,000
	85,250	**85,250**	**85,250**
Less dryland			9,250
Total area affected by irrigation			**76,000**

13 Those relative areas reflect:

- a significant increase in mixed irrigated systems, where 50% of the farm can be irrigated in any one season, but a mix of crop, beef and sheep allows strategic irrigation of high water priority areas (after crops in the pre January period and stock areas or greenfeed in the post January period).

- a move away from process crops with a high mid summer water demand. In the model budget, we have replaced the process crop with 2nd year grass followed by greenfeed to target winter lamb finishing.

- a very small (3,000ha) increase in dairying over current dairy areas, but dramatically less than that budgeted in 2007. The increase reflects a small number of farmers where good storage economics, reasonable soil moisture holding capacity (775mm) and semi-reliable rainfall combine to create adequate water reliability.

- elimination of intensive summer livestock finishing that is dependent on reliable pasture and/or greenfeed growth in mid summer.

14 Those changes could be smaller if freed up groundwater resource within the scheme can be re allocated to farms with run-or-river water who do not have sufficient reliability for dairying. That is, freed up groundwater reserves could be used to create reliability for users of unreliable run-of-river than for new irrigation.

15 Price assumptions for key outputs ($/kg or ton) on the farm models are:

	Mar 08	Aug 09
milk solids	$5.50	$5.50/kgMS
lamb	$3.60	$4.30/kgCW
milling wheat	$400	$440/ton
feed wheat	$360	$380/ton
feed barley	$350	$350/ton
beef	$3.50	$3.50/kgCW

The only significant change to the long run expected values is to lamb, where, as expected, the increase in the lamb market has occurred.

Returns in the 2007/08 season were all well above the above figures used. Current lamb, beef and milling wheat prices are at, or above our long run projections. Feed grain and milk prices are currently below our long run projections.

16 Relative to the 2007 data, total capital investment is lowered significantly, as is the incremental EBIT.

17 Farm profitability in the area affected by Central Plains Water is expected to rise by $80,897,000 ($1,064/ha) from a weighted average of $804/ha to $1,867/ha.

18 The capital invested to generate that EBIT is $545,661,000 or $9,094/ha including CPW shares.

19 The marginal return on capital invested is 15.7%.

While the total return is well back from the 2007 figure of $186M, the marginal return is slightly improved on the 2007 figure of 14.75%.

20 Total farm expenditure rises by $64,751,000 ($853/ha). The majority of that expenditure is spent in the local or regional community.

21 The relative marginal returns marginal on capital for dryland converted to irrigation with the listed land uses are:

1.	Mixed livestock and crop, part irrigated	=	16.1%
2.	Arable/process crop	=	21.1%
3.	Arable/lamb winter finishing	=	16.6%
4.	Dairy with scheme and storage	=	9.6%
5.	Dairy with wells	=	8.9%
6.	Dairy with scheme water added to wells	=	24.4%

Capital Costs

Since the April 2007 data was prepared, we have seen a considerable spike in land values, and an associated increase in development costs. In the past 9 months part of that spike has retraced.

Because farmers will make decisions relative to current land values and development costs, we have reviewed both land values and development costs.

Off farm capital costs were budgeted at $6,826/ha in December 2007 including reservoir storage. Without the reservoir this becomes $2,860/ha in the revised budgets, large reduction in capital invested, and one that reduces the initial financial hurdle despite long run economics requiring group storage.

22 Based on the capital costs above, current average return on capital is 2.2%. Post scheme deployment, the return is 3.8%.

That improvement is very significant to cash flow net of interest. Most development capital will be borrowed, typically between 6.5% and 8.5%, so for farmers to proceed, they will need marginal returns over 10% and a total return on capital around 5 ï 7%.

Absolute return on capital is summarised in 5.7 of our support information.

For clarity, I summarise those returns as:

Pre irrigation:	
- dryland livestock	0.5%
- mixed irrigated	3.4%
- dairy irrigated	4.3%
Post scheme deployment:	
- mixed livestock/arable with 50% water	3.7%
- arable and process crop	5.8%
- arable/winter lamb finishing	3.8%
- irrigated dairy	6.3%

The absolute returns are low, as is typical for farmland return on capital. They reflect increased land values relative to EBIT. More importantly, they do show potential to achieve returns in the desired 5 ï 7% range.

23 Despite the lack of reliability, farmers are just as likely to support this revised scheme initiative as the original concept.

Offsetting the lack of reliability will be the huge cost savings, which will generate an easier debt component to service and gain banking approval.

That initial debt will drive short term decisions of existing farmers, with the lower reliability being more significant to the medium term plans of existing farmers, and to the plans (short or medium) of new farmers to the area, who will compare reliability with other schemes.

24 Better long term storage options will be required for any further change of land use. I expect any future storage options will include existing aquifer storage, on farm storage and investigation for large communal off-farm storage once farmers have further invested in that infrastructure.

AW Macfarlane
September 2009