BEFORE INDEPENDENT HEARING COMMISSIONERS

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the hearing of submissions on Proposed Variation 1 (Selwyn-Waihora) to the Proposed Canterbury Land and Water Regional Plan

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REBUTTAL OF IAN MCINDOE ON BEHALF OF IRRIGATION NEW ZEALAND INCORPORATED and DUNSANDEL GROUNDWATER USERS ASSOCIATION INCORPORATED

Dated: 8th September 2014

INTRODUCTION

1 My name is Ian McIndoe.

2 I have provided a summary of my qualifications and expertise in my primary evidence.

SCOPE OF REBUTTAL

3 The scope of my rebuttal is limited to matters related to water quantity. In preparing this rebuttal I have responded to comments in evidence of the following witnesses:

3.1 Cathy Begley for Te Runanga O Ngai Tahu.

3.2 Alistair McKerchar for Te Runanga O Ngai Tahu.

3.3 Geoffery Deavoll for Department of Conservation.

3.4 Tony Davoren for HydroServices and HydroTrader.

CATHY BEGLEY

4 Ms Begley addresses water quantity at paragraphs 38 to 61. In my rebuttal I respond to the issues of:

4.1 whether it is uncertain as to how much groundwater the Central Plains Water scheme (**CPW**) will introduce;

4.2 the relationship between groundwater allocation limits and minimum flows;

4.3 how the Variation can address over-allocation; and

4.4 the implications of allocating water on an "actual use" basis.

5 Although Ms Begley is suggesting that a clear set of steps for reducing current allocation to the currently proposed allocation limits is not provided in Variation 1, my interpretation is that Variation 1 is promoting a planned approach to reducing allocation. As I understand it, specific steps such as combining surface water and groundwater allocations, surrendering of groundwater takes in the CPW command area, allocating water on the basis of 8.5 years out of 10, allocating water on the basis of use, as examples, are all proposed to move current allocation towards the proposed limits.

6 The issue, from a water quantity perspective, is that the catchment is undergoing significant hydrological change through the development of the CPW irrigation scheme and the allocation

limits do not reflect the implications of that change. In my opinion, if the allocation limits are meant to be set in anticipation of that change, they are incorrect.

7 I disagree with Ms Begley's point that there is a high degree of uncertainty about the amount of water that will become available once CPW becomes operational. It is not difficult to determine the effect of new irrigation on recharge. I did so in my primary evidence. My conclusions agree with those modelled by the Councils officer's independently (CRC R14/16 para 3.2). There is no doubt CPW will result in an increase in lowland stream flows due to a significant transfer of alpine water to the groundwater system. Because the proposed irrigated area is distributed over a wide area in the upper plains, my view is that the benefits of that recharge will also be distributed over all of the lowland streams.

8 Ms Begley's evidence criticises Variation 1 for relying upon CPW to address concerns regarding over-allocation of the groundwater system and, in turn, allow for minimum flows to be raised. In my opinion, groundwater allocation limits are a convenient way of addressing the cumulative effects of abstraction. It is unrealistic to expect specific streams to respond to allocation limits in specific ways, especially in relation to minimum flows or other flow statistics.

9 We can only predict the general response. My evidence and that of the Canterbury Regional Council (**CRC**) groundwater modellers is that CPW recharge will return lowland stream flows to close to their natural state. That conflicts with statements by Dr Williams that CPW recharge will not be enough to "fix" the flows in lowland streams.

10 I do not comment on the setting of minimum flows, but I agree they are not a mechanism for addressing over-allocation. They address the effects of direct takes or stream depleting takes on particular rivers and streams. Raising minimum flows will reduce reliability of supply to direct or stream depleting takes. CPW recharge will increase flows in streams overall, increasing reliability, but there will be variability in the response from stream to stream. The effect of raising minimum flows on stream depleting abstractors will therefore vary.

11 While allocation limits can have some impact on 7D MALFs in streams overall, allocation limits and the variable use of water within those allocation limits cannot be used to accurately achieve specific flows on particular streams. Many factors affect lowland stream low flows, and full consideration should be given to the general impact of allocation limits on flow regimes (as presented in Report R14/16 Figure 4, Figure 6 for example) rather than focussing on low flows in specific streams. Regardless of where allocation limits are set, minimum flows would still be needed to manage direct effects in sensitive streams**.**

12 I have proposed revised allocation limits in my primary evidence. My limits are based on the capacity of the resource before, during and after CPW is fully commissioned. Before CPW is commissioned at all, I recommend immediate removal of all adaptively managed consents

from the primary allocation block and placing them in a “B” block. I also recommend (on the assumption the current situation is unsuitable but without specifically assessing or agreeing that point) implementing a stepped allocation regime that takes into account the additional recharge from CPW.

13 As suggested in my evidence, I proposed a stepped regime similar to that given in the table below.

Proposed allocation limits (million m^3/year)

Zone	A-Block pre CPW	B-Block pre CPW	A-Block post Stage 1 CPW	A-Block post CPW additional groundwater
Selwyn-Waimakariri (SW)	193	25	218	90
Rakaia-Selwyn (RS)	180	35	215	90
Little Rakaia (LR)	85.9		85.9	
TOTAL	**458.9**	**60**	**518.9**	**180**

14 In my evidence, I expressed my concern that I did not know how the allocation limits in Table 11(e) in Variation 1 were calculated. On that basis, I cannot specifically agree with the A-Block pre CPW limits. The limits in Table 11(e) need to be justified, and if necessary revised.

15 The A-Block post Stage 1 CPW is the sum of the A and B Blocks pre CPW. Once CPW is operational, the B Block consents convert to “A” Block. The A-Block post CPW additional groundwater is the allocation for the 30,000 ha of existing groundwater consents within the CPW scheme that, in my view, can be retained while keeping to the Variation 1 water quantity targets.

16 Ms Begley (para 43) states that the Variation does not make any attempt to align actual water uses required for farming activities against the consented use quantities for the same activities.

17 Policy 14 states that abstraction of groundwater is subject to several conditions, including Schedule 10, which outlines methodologies for determining reasonable use. It provides an allocation based on demand conditions that occur 9 years out of 10 (varied to 8.5 years out of 10 in Variation 1). Once the Schedule has been applied to consents, all allocations will be consistent and aligned with the reasonable use test.

18 Actual use will vary from year to year and will in most years be less than the allocated amount. Determining whether use is efficient in individual years is a compliance issue. In general, excess use, should it occur, does not result in additional water being removed from the groundwater system, as actual use is limited by evapotranspiration. Water applied in excess of need returns to the groundwater system.

19 "Reasonable use" will not give consent holders more than they need – the conditions in Schedule 10 ensure that is the case. Actual use is not indicative of what allocation they need, as on average, use will always be less than allocation except in that 1 in 10 high demand year.

ALISTAIR MCKERCHAR

20 Dr McKerchar (para 9) has used regression techniques to attempt to determine whether abstraction for irrigation has had a significant effect on low flows in the Selwyn River. He has stated that it is inconclusive whether increased withdrawals have caused low flows (para 9), but (para 30) has calculated a 32 l/s per year drop in flows due to abstraction.

21 His analysis only considers stream flow data until 2006, which he states shows a declining trend on top of flow variations due to climatic (recharge) variability and variability in Whitecliffs flows. In my view, if he had included stream flow and climate data until 2014, he may well have come to a different conclusion. The hydrological system has gone through a dominant recharge phase since 2006, with near record high groundwater levels occurring this year, which I expect would impact on the regression. Dr McKerchar acknowledges in his conclusions (para 37) that the robustness of the results need to be confirmed with data accumulated since 2006. I agree. It should have been done. Without it, his evidence of a 32 l/s/year drop in flows due to abstraction is of limited value.

22 I agree (para 26) that most of the year-to-year variation in Selwyn/Waikirikiri River low flows can be explained by Whitecliffs flow and recharge to groundwater. In my view, the higher Whitecliffs flows and groundwater recharge (see Figure 1 in my CPW evidence) that has occurred in recent years will strengthen that conclusion.

23 I agree with his points in paragraphs 19 (a)-(e), although I caution that his soil moisture recharge analysis is very simplistic and relates to recharge on unirrigated land only. It does not include recharge on irrigation land, which is substantially higher than dryland recharge. Not including irrigation recharge makes the conclusions drawn from his analysis less certain.

24 I note that Dr McKerchar states that the linkage between recharge and groundwater levels (para 23) is worthy of investigation. I point out that the Aqualinc groundwater model (and previous eigen-modelling) has already done that**,** and that the modelling includes recharge on irrigated land.

25 I think that his analysis, including the calculated 32 l/s reduction in the Lower Selwyn River due to abstraction, should be regarded as indicative only. It does not properly consider a number of factors that impact on the relationship such as irrigated recharge not being accounted for, variation in irrigation demand from year to year, use of only two soil types, not using the full record of data, as examples.

26 Although not specifically stated, the implication from the analysis is that the calculated 32 l/s reduction per year in the Selwyn River will continue, resulting in lower flows going forward. However, that is highly unlikely to occur in the future, and probably has not occurred in the last few years. There has not been a significant increase in irrigated area since about 2008 (very few consents for new irrigation have been granted, and those that were have minimum water level conditions on them). Without CPW coming on stream, it is unlikely that irrigated area will increase in more than a small way. The over-allocated status of the catchment and present levels of development will prevent that from happening. With CPW coming on-stream, there will be greater recharge and flows in the lowland streams, which will have the effect of neutralising any effect abstraction may have had on the Lower Selwyn/Waikirikiri River flows.

27 Dr McKerchar states (para 32) that, based on his results, it is possible that if enhanced recharge occurs with irrigation in the CPW scheme, low flows in the lower Selwyn/Waikirikiri may be enhanced. I agree, although I would use the term 'almost certainly', rather than 'possible'.

GEOFFREY DEAVOLL

28 Geoffrey Deavoll raises similar issues to Ms Begley with respect to timeframes and methods for phasing out over-allocation.

29 I support his comment (para 41) that groundwater consents within the CPW scheme should be able to be retained for irrigation on the property consent applies to, to buffer the lower reliability of the scheme water take. Retaining rather than surrendering groundwater consents within the CPW scheme will impact on phasing out of over-allocation, but I make the point that the current allocation limits have not accounted for this need.

30 I disagree with his view (para 43) that 50% of water transferred being surrendered is justified on the basis that not all water allocated is used. Mr Deavoll fails to acknowledge that full allocation will rarely, if ever, be used. My primary evidence has discussed that under current on-farm allocations, less than 70% of water on average should be used if water is applied and used efficiently.

31 I agree with Mr Deavoll's reasonably straight forward statement (para 44) that the current effects (which he has not quantified) of cumulative groundwater abstraction in the catchment, on flows in lowland streams are caused by the existing take and use of water. I also agree that

allowing currently allocated but unused water to be transferred to another site where it can be used will have the effect of more water being taken, exacerbating cumulative effects on flows downstream. However, I agree with Dr Davoren that most transfers do not fall into that category.

TONY DAVOREN (HYDROSERVICES)

32 I support Dr Davoren's evidence that the Kaituna Groundwater Allocation Zone needs to be revised on the basis of the available information pertaining to that zone.

33 I support Dr Davoren's evidence that the adaptive management consents should not be included in the primary allocation block for the reasons he has given and which I have addressed in primary evidence.

34 I also agree with Dr Davoren (para 26) that the limits in sub-regional chapters (such as Selwyn-Waimakariri Combined Surface and Groundwater Allocation Zone) should be robust, based on detailed investigations and, be capable of simple and transparent revision as better data becomes available. As stated in my evidence, I have been unable to understand how the allocation limits in Variation 1 were determined, although I note that Dr Davoren states that they are based on the NRRP second order limit setting process. I did not think they were, but if they are, the second order process is a "rule of thumb" process that does not properly account for the effect of taking groundwater on the groundwater and surface water resources.

TONY DAVOREN (HYDROTRADER)

35 I agree with Dr Davoren (para 14) that not all transfers are unused water. I made that point in my evidence, based on Aqualinc's experience with preparing resource consent applications for clients wishing to transfer water.

36 I also agree with him (para 17) that the volume of current transfers is small relative to allocation in general. I made the point in my primary evidence that if the CPW scheme proceeds and recharges the groundwater system as expected, there should be room for the CPW shareholder groundwater consents to be transferred and still keep cumulative effects within the Variation 1 targets.

Dated 8th September 2014

Ian McIndoe.